

J.V. C. Smith.

Boston.

CLASS BOOK

OF

ZOOLOGY:

DESIGNED TO AFFORD TO

PUPILS IN COMMON SCHOOLS AND ACADEMIES

A KNOWLEDGE OF

THE ANIMAL KINGDOM:

WITH A LIST OF THE DIFFERENT SPECIES FOUND IN THE
STATE OF NEW-YORK.

THE WHOLE SCIENTIFICALLY AND SYSTEMATICALLY
ARRANGED.

By PROF. B. JAEGER.

NEW-YORK:

D. APPLETON & COMPANY, 200 BROADWAY.

PHILADELPHIA:

GEO. S. APPLETON, 164 CHESNUT-ST.

M DCCC XLIX.

S. V. C. Smith
Boston.

40

140 6

57





QL
48
J34
1849
SCNHRB

TESTIMONIALS.

I.

College of N. Jersey, Jan. 16, 1846.

The undersigned testify that Professor B. Jaeger was connected with this Institution from 1831 to 1840, as an Instructor in Natural History and Modern Languages, and during that time gave satisfactory proofs of his acquaintance with these subjects; and we take pleasure also in testifying to his gentlemanly deportment,—also, that he resigned his station in the College with the regret of the Faculty and Trustees.

JAMES CARNAHAN, *President.*

JOSEPH HENRY, *Prof. Nat. Phil.*

STEPHEN ALEXANDER, *Prof. of Math. & Astron.*

Alexandria, D. C., Jan. 5, 1846.

Professor B. Jaeger, formerly of New Jersey College, at Princeton, resided in Alexandria, D. C., from 1840 to 1845, and was here universally esteemed as a learned Naturalist, an excellent linguist and a profound scholar in science and literature, as well as generally beloved on account of his amiable disposition, sober and industrious habits and gentlemanly qualities.

We take, therefore, great pleasure in testifying the above statement by subscribing our names:—

P. E. Hoffman, Esq.

Edw. C. Fletcher, Esq.

Hugh Smith, Esq.

Anth. Cazenove, Esq.

Edm. Green, Esq.

Orl. Fairfax, M. D.

Rob. Brockett, Esq.

Benj. Barton, Esq.

R. H. Stabler, M. D.

Caleb Hallowell and Brother.

Rob. Miller, Esq.

W. Fowle, Esq.

Geo. D. Fowle, Esq.

W. H. Fowle, Esq.

Thos. W. Smith, Esq.

Phineas Janny, Esq.

H. C. Smith, Esq.

John Leadbeater, Esq.

Wash. C. Page, Esq.

Washington City, January 5, 1846.

We, the undersigned, testify that Mr B Jaeger (from 1831 to 1840 Professor of Botany, Zoölogy and Modern Languages, at the New Jersey College in Princeton, and since a resident of the district) is a gentleman of profound knowledge and high standing in society, but principally distinguished as a Botanist, Zoölogist and excellent Linguist. We also take pleasure in adding our testimony to the high and honorable bearing of Professor Jaeger, since we had the pleasure of knowing him.

Y. L. Edwards, *Commiss. of Pensions.*

J. J. Abert, *Col. Corps. Eng.*

Francis Markoe.

W. D. Nutt, *of the Treas. Depart.*

A G Dayton, *Fourth Auditor of the Treas.*

W H Swift, *Capt. Topog. Eng.*

Winfield Scott, *Gen. U. S. Army.*

T. G. Totten, *Col. Eng.*

T. M. Johnson, *P. M. House of Repres.*

A. D. Bache, *Supert. U. S. Coast Survey.*

G. F. Blake, *U. S. Navy.*

Dan. Ratclief, *Attorn. at Law.*

Wilson M. C. Fairfax, *U. S. Coast Surv.*

Th. P. Jones, M. D., *Prof. of Chemistry.*

Ch. M. Keller, *late Chief. Exam. of Pat's.*

William T. Stone, Esq.

Professor James P. Espy.

The subscriber has been acquainted with Mr. B. Jaeger, (formerly professor of Botany, Zoölogy and Modern Languages, in Princeton College, New Jersey,) for several years. Mr. Jaeger filled the situation from 1831 to 1840.

The subscriber knows that the late Professor Hassler entertained the highest opinion of the attainments and the character of Mr Jaeger. As one well qualified to judge of the merits of Mr. Jaeger, the testimony of Mr. Hassler will go far to establish the reputation of Mr. Jaeger with those who have not the advantage of his acquaintance, but who, knowing Mr. Hassler, would have great confidence in his opinion as a scientific man.

The high testimonials received by Mr. Jaeger from the present Faculty of Princeton College, together with other evidences of his standing as a man of science, now in his possession, will doubtless be considered to present abundant proofs to such as may feel a disposition to know the reputation of Mr. Jaeger.

Washington, January 20, 1846.

W. H. SWIFT.

It affords me great pleasure in uniting my testimony in behalf of the meritorious claims of Professor B Jaeger, late of Nassau Hall, Princeton, N. J., distinguished in the departments of Natural History and Modern Languages, in which capacity he officiated at that institution for several years up to 1840.

Professor Jaeger is also a gentleman in deportment, and of exemplary moral character.

SAM. HAMILTON, *Attorney at Law.*

Trenton, N. J., January 20, 1846.

Washington, February 14, 1846.

Having been a student of Princeton College while Professor Jaeger was connected with that institution, I take great pleasure in testifying to his ability in the departments of Natural History and Modern Languages, and cheerfully recommend him as a gentleman of correct deportment and exemplary moral character.

J. G. HAMPTON, *Representative of New Jersey.*

Washington, February 14, 1846.

The undersigned, although not personally acquainted with Professor Jaeger, are satisfied, from the excellent reputation which he enjoyed as Professor of Natural History and Modern Languages in Princeton College, that his ability in those departments of knowledge is undoubted; and, from the representations of our friends, in whom we have confidence, and who have known Professor Jaeger for a long time, we are also satisfied that he is a gentleman of good moral character.

Hon. W. W. Wright, *Representative from New Jersey.*

Hon. W. Miller, *Senator from New Jersey.*

Hon. John Runk, *Representative from New Jersey.*

Hon. Geo. Sykes, *Representative from New Jersey.*

Hon. J. E. Edsall, *Representative from New Jersey.*

II.

May 5, 1848.

This certifies, that Professor B. Jaeger has given a course of lectures on Zoölogy, before the pupils of the higher departments of this Institution, which has given great satisfaction. The Professor, from his extensive travels in various parts of the world under the patronage of the Emperor of Russia, has enjoyed facilities for the acquisition of knowledge in his department, which fall to the lot of few Naturalists. Besides this, from his

long connexion with Princeton College as Professor of Natural History, he has had an opportunity of arranging his knowledge so as with ease to communicate it to others. I most cheerfully recommend him to the friends of Education, as a teacher of great learning and experience, and a gentleman of probity and excellence of character.

CHARLES E. WEST,
Principal Rutgers Institute.

III.

New-York, May 20, 1848.

I take pleasure in saying, that Professor Jaeger has delivered his course of Eight Lectures on Zoölogy to the Young Ladies of the Rutgers Female Institute with great success, and so much gratified have we been, that arrangements are now completed for a course on Botany. Professor Jaeger proves himself to be a man of great attainments in the Departments to which he devotes himself, while his courteous and gentlemanly manners will always win the good feeling of those he instructs.

ISAAC FERRIS,
President of the Trustees of R. F. Institute.

IV.

New-York, Oct. 9, 1848.

I beg leave to introduce Professor Jaeger to those schools in this city, which are accustomed to employ distinguished Lecturers on various branches of Science and Literature. He comes to us with the highest recommendations as a man of science, and as one who has particularly distinguished himself in Natural History. It is on this subject that he proposes to lecture.

I have heard him deliver two lectures. Judging from them, as well as from an acquaintance of some months, I shall feel it a privilege to employ him as a lecturer in my school. Although a foreigner he has a good command of our language, and presents his ideas with great clearness. Natural History has not been collected by Professor Jaeger merely from books: he has himself traversed vast countries in independent researches. Hence his lectures are invested with an interest which belongs only to one who has himself seen what he describes.

It appears to me that our higher Seminaries would very much

enrich their educational courses by the introduction of Natural History. Is there not now an auspicious opportunity for the introduction of this branch, when a gentleman of Professor Jaeger's attainments offers himself to take charge of it, for the very purpose of initiating our Youth into its Elements?

HENRY P. TAPPAN.

V.

From the N. Y. Daily Tribune, Monday Evening, Oct. 23, 1848.

PROFESSOR B. JAEGER:—We perceive, that this distinguished savan will read a paper before the New York Historical Society, at the meeting for the present week. From the long experience and high reputation of this gentleman we are sure that any effort he makes before so learned a society will be profoundly interesting. Professor Jaeger has lived a life of study, and has devoted himself wholly and with ardor to the cause of science. A long career of usefulness, during which he traversed many of the most interesting portions of Europe and the East, in prosecuting his scientific researches, conferred upon him a European fame unsurpassed by his compeers; and this reputation, which he some years ago brought to America, has been confirmed and extended during his residence among us. It is in the department of Natural History, Botany and Technology that Professor Jaeger most excels, while his knowledge of languages is so thorough and extensive that he has for some years held the post as Professor of Languages, in one of our most popular universities.

We have heard with sincere pleasure, that the friends of Professor Jaeger are about suggesting to the Board of Directors of the Free Academy, soon to go into operation here, to add to its facilities a department of Natural History and Technology, (with which that of Languages might be united) and to confer upon him the Professorship. For our own part we think the suggestion eminently worthy of consideration; and we respectfully urge it upon the favorable attention of the proper authorities of the new Institution which is about to crown with completeness our noble system of Public Education.

VI.

New-York, March 14, 1849.

Professor Jaeger formerly gave lectures, for several years, in my school in Princeton, New Jersey, on the several branches of Natural History. He is a gentleman of much science, and an interesting and instructive lecturer. He has prepared a class-book for the use of schools on the subject of Zoölogy, which I have examined with satisfaction. His work is prepared with a thorough knowledge of the subject, and must prove a valuable addition to the means of elementary education. The method is scientific, while the style is generally free from technical terminology, and is sufficiently intelligible to be adapted to the intelligence of those for whom it is designed.

E. C. WINES.

VII.

I have examined with much care the "Class Book of Zoölogy" by Professor B. Jaeger, and am persuaded that it is admirably adapted to the purpose he has in view, namely, of supplying a school-book on this subject for our Common Schools and Academies; and that its merits, for this purpose, far exceed those of any other book on this subject, now before the public. The substitution of English for Latin and Greek terms is an important feature, which will commend it to the favor of all who are unacquainted with these languages. The want of such an elementary book has rendered the science of Zoölogy almost unknown, and I see no reason why, with the facilities which such a manual will afford, it may not be made one of the subjects of general education. Prof. J. has delivered several lectures on Zoölogy before the teachers and pupils of the Public Schools of Brooklyn, in which he was peculiarly successful in simplifying the science to the comprehension of the younger portion of his hearers, and in eliciting their deep attention and interest.

GEO. W. FITCH,

Principal of Public School No. 6, Brooklyn.

March 20 1849.

MISCELLANEOUS.

APPLETON'S Library Manual, a valuable book of reference for the book-buyer and seller. 500 pages, 8vo, paper cover, \$1 00; half roan 1	25
APPLETON'S Railroad & Steamboat Companion, with 30 Maps, 1	25
AGNEL'S Chess for Winter Evenings, a complete guide to the Game. Steel illustrations, 12mo. 1	75
ARNOLD'S Miscellaneous Works. 8vo.....	2 00
BRYANT'S What I Saw in California. 12mo.....	
CHAPMAN'S Instructions on the Use of the American Rifle.....	1 25
COOLEY'S American in Egypt. Illustrated.....	2 00
DON QUIXOTTE de la Mancha. Translated from the Spanish. 18 steel plates.....	1 50
DELEUZE'S Treatise on Animal Magnetism.....	1 00
EVERETT'S System of English Versification.....	75
EDWARDS' Voyage up the Amazon.....	1 00
ELLIS'S Mothers, Daughters, and Women of England. Each.....	50
FARNHAM'S Rationale of Crime	75
FOSTER'S Literary Miscellanies.....	1 25
FROST, Prof., Book of Good Examples. 12mo. Illustrated.....	1 00
FROST, Anecdotes. 12mo. Illustrated.....	1 00
FROST, Travels in Africa. 12mo. Illustrated.....	1 00
FROST, Illustrious Mechanics. 12mo. Illustrated.....	1 00
GOLDSMITH'S Vicar of Wakefield. Illustrated.....	75
GRANT'S Memoirs of an American Lady.....	75
GRANTLEY MANOR, a Tale. By Lady Fullerton.....	75
GIL BLAS, Adventures of Translated by Smollett. Steel plates.....	1 50
KENNY'S Manual of Chess.....	25
KIP'S Christmas Holydays in Rome	1 00
LAMARTINE'S Pilgrimage to the Holy Land. 2 vols.....	1 75
LANMAN'S Summer in the Wilderness. 12mo.....	50
LEGER'S History of Animal Magnetism.....	1 25
McINTOSH'S Two Lives, a Tale	75
McINTOSH'S Aunt Kitty's Tales	75

McINTOSH'S Charms and Counter Charms (a new work).....	1 00
ROUGH AND READY BOOK; or, Military Souvenir of General Taylor's Victories.....	1 00
ROBINSON CRUSOE. The only complete edition, with 300 plates. 1 vol.....	1 75
REID'S New English Dictionary..	1 00
RATIONALE OF CRIME. By Sampson. Ed. by Mrs. Farnham.	75
RICHARDSON on Treatment of Dogs.....	25
SAWYER'S Plea for Amusement	50
SKETCHES (THE.) Three Tales. By Miss Sewell, etc.....	1 00
SEWELL (Miss.) Amy Herbert, Gertrude, Laneton Parsonage, and Margaret Perceval. Paper, 50 cts. each vol., cloth.....	75
SOUTHGATE, Bp., Visit to Syrian Church....	1 00
TUCKERMAN'S American Artist Life.....	75
WAYLAND'S Real Life in England.....	38
WANDERINGS and Fortunes of some German Emigrants.....	75

SCIENCE AND USEFUL ARTS.

BOUISSANGAULT'S Rural Economy.....	1 50
COOLEY'S Cyclopædia of 6000 Practical Receipts, in all branches of Arts, Manufactures, and Trades	2 25
FARMER'S TREASURE, (THE.) A Manual of Agriculture.....	75
FRESENIUS' Qualitative Chemical Analysis.....	1 00
HODGE on the Steam Engine. 48 plates.....	10 00
HALLECK'S Elements of Military Art and Science. Illustrated	1 50
HALL'S Principles of Diagnosis..	2 00
LAFEVER'S Beauties of Modern Architecture. 48 plates.....	6 00
MARSHALL'S Farmer's Hand-Book.....	1 00
MILES on the Horse's Foot.....	25
PARNELL'S Chemistry applied to the Arts.....	1 00
STEWART'S Stable Economy..	1 00
THOMSON on the Food of Animals and Man.....	50
URE'S Dictionary of Arts and Sciences, with supplement. New edition. 1 vol.....	5 00
WILSON on Healthy Skin. Illus.	1 00

COLLEGE AND SCHOOL TEXT-BOOKS,

Published by D. Appleton & Co.

I GREEK AND LATIN.

ARNOLD'S First and Second Latin Book and Practical Grammar. 12mo.....	75
ARNOLD'S Latin Prose Composition. 12mo.....	1 00
ARNOLD'S Cornelius Nepos. With Notes. 12mo.....	62
ARNOLD'S First Greek Book..	62
ARNOLD'S Greek Prose Composition. 12mo.....	75
ARNOLD'S Greek Reading Book. Edited by Spencer. 12mo.	1 50
ARNOLD'S Cicero's Select Oration. Notes by Johnson. 12mo.	
BEZA'S Latin Testament. 12mo.	63
LIVY, with Notes by Lincoln. 12mo.....	1 00
CÆSAR'S Commentaries. Notes by Spencer. 12mo	

In Press.

CICERO, De Senectute and De Amicitia. Notes by Johnson. 12mo.	
CICERO, De Officiis. Notes by Thatcher.	
SEWELL'S Classical Speaker. Edited by Reed. 12mo.	
ALLUST, with Notes by Butler 12mo.	

II. FRENCH.

COLLOT'S Dramatic French Reader. 12mo.....	1 00
DE FIVAS, Elementary French Reader. 16mo.....	50
OLLENDORFF'S New Method of learning French. Edited by J. L. Jewett. 12mo.....	1 00
KEY to do.....	75
ROWAN'S Modern French Reader. 12mo.....	75
SURRENNE'S French Pronouncing Dictionary. 12mo...	1 50

III. GERMAN.

ADLER'S Progressive German Reader. 12mo.....	1 00
GERMAN and English and English and German Dictionary, compiled from the best authorities. 1 vol. large 8vo. (In press.)	
Do. Abridged. 16mo. (In press.)	
OLLENDORFF'S New Method of learning German. Edited by G. J. Adler. 12mo.....	1 50
KEY to do.....	75

IV. ITALIAN.

FORESTI'S Italian Reader. 12mo.....	1.00
-------------------------------------	------

OLLENDORFF'S New Method of Learning Italian. Edited by F. Foresti. 12mo.....	1 50
KEY to do.....	75

V. SPANISH.

OLLENDORFF'S New Method of Learning Spanish. By M. Velazquez and T. Simonné. 12mo.....	1 50
KEY to do.....	75
VELAZQUEZ'S New Spanish Reader. With Lexicon. 12mo.	

VI. HEBREW.

GESENIUS'S Hebrew Grammar. Edited by Rödiger. Transl. from the best German edition by Conant. 8vo.....	2 00
--	------

VII. ENGLISH.

ARNOLD'S Manual of Roman Antiquities (In press.)	
ARNOLD'S Manual of Grecian Antiquities. (In Press.)	
ARNOLD'S Lectures on Modern History. 12mo.....	1 25
EVERETT'S System of English Versification. 12mo.....	75
GRAHAM'S English Synonyms. Edited by Prof. Reed, of Pa. University. 12mo.....	1 00
GUIZOT'S History of Civilization. Notes by Professor Henry, of N. Y. University. 12mo....	1 00
KEIGHTLEY'S Mythology of Greece and Rome. 18mo.....	42
MAGNALL'S Historical Questions. With American additions. 12mo.	
MARKHAM'S School History of England. Edited by Eliza Robbins, author of "Popular Lessons." 12mo.....	7.
MANDEVILLE'S Course of Reading for Common Schools and Lower Academies. 12mo..	75
MANDEVILLE'S Introduction to the above, Parts 1 & 2. 18mo.	each 37
REID'S Dictionary of the English Language, with Derivations, &c. 12mo.....	1 00
TAYLOR'S Manual of Modern and Ancient History. Edited by Prof. Henry. 8vo. cloth or sheep.....	2 50
TAYLOR'S Ancient History, separate.....	1 25
TAYLOR'S Modern do.	1 50
WRIGHT'S Primary Lesson. & Child's First Book.....	12

CLASS BOOK
OF
ZOOLOGY:

DESIGNED TO AFFORD TO
PUPILS IN COMMON SCHOOLS AND ACADEMIES

A KNOWLEDGE OF
THE ANIMAL KINGDOM:

WITH A LIST OF THE DIFFERENT SPECIES FOUND IN THE
STATE OF NEW YORK.

THE WHOLE SCIENTIFICALLY AND SYSTEMATICALLY
ARRANGED.

BY PROF. B. JAEGER.

NEW YORK:
D. APPLETON & COMPANY, 200 BROADWAY.

PHILADELPHIA :
GEO. S. APPLETON, 164 CHESNUT-ST.

M DCCC XLIX.

Entered according to Act of Congress, in the year 1849,

By D. APPLETON & COMPANY,

in the Clerk's Office of the District Court for the Southern District
of New York.

151642
8758
822

P R E F A C E .

NATURAL HISTORY, as a subject of study in our common schools and academies, has not hitherto, it is believed, been duly appreciated, nor received that attention which its relative importance, compared with other studies, demands.

This is a utilitarian age ; and the ingenious calculations of profit and loss, which characterize the pursuits of men in life, have extended their baleful influence to the schoolroom, and shut out from thence several of those themes of study and investigation, from which many of our purest and most rational pleasures are derived.

The effect of this spirit has been, as every intelligent person must be aware, to disparage those studies which do not have a direct and palpable connection with the business pursuits of the age. While every one will acknowledge, that there are certain elementary branches, which should always be placed first on the programme of instruction, because a familiarity with them is demanded in the most ordinary transactions of business ; it should nevertheless be remembered, that the world around us is teeming with objects of admiration and delight, well fitted for the contemplation of the expanding mind, and presenting to it new avenues of happiness and enjoyment.

Natural History embraces the great field of nature—both animate and inanimate. It relates to the universe around us,—to the earth on which we tread, to the air we breathe, and to the million phases of organic life in air, earth, and sea, from the simple Infusoria, which give life and animation to the stagnant pool, to the ponderous Elephant and

the enormous Whale. It is a subject, fraught with the highest interest to all; and one has but to enter the portals of this science, to ensure his further progress among the wonders and beauties, which he sees everywhere spread out before him.

But beyond the *interest*, with which this science is invested, there are positive *benefits* resulting to him who pursues it in a *methodical* manner—the only manner, in fact, in which it can be truly said to be, in the highest sense, either instructive or profitable; and these are the ideas and habits of arrangement and classification, which it is so well calculated to afford.

This is particularly the case with Zoology. Of a large number of objects, widely dissimilar in almost all respects, many divisions are made by selecting certain characteristics, in which all in each division agree. Such, for instance, is the department of Vertebrates, which includes Mammalia, Birds, Reptiles, and Fishes, each of them having a spinal column. These again are subdivided according to well-defined principles of classification; and thus each individual is systematically arranged in its proper place, depending upon its structure or other peculiarities.

Studies of such a nature are happily calculated to form habits of order and method, essential features of a sound education.

The study or examination of a subject with the aid of science is always invested with an interest, which is lost to him who has not such a help and guide. Without attempting to analyze the reasoning by which this fact is established, it will not be denied, that he who brings to his investigations in any department of knowledge, the results of past experience and observations, is furnished with enlarged powers of improvement and increased capacities for enjoyment; and there are not wanting instances, as in the cases of Wilson and Audubon, when in their pursuits in one department of Zoological science, they have left the comforts of home and civili-

zation, and plunged into trackless wilds in search of objects, fraught to them with so much pleasure and delight. To such neither woods, fields, nor marshes are destitute of pleasing subjects of study and investigation.

It is peculiarly appropriate and desirable, that in America, which with its uncultivated wilds and untrod deserts comparatively is a new field of researches for the naturalist, that Natural History should be one of the subjects of general education; the happy effect of which, if properly conducted, would be, to open upon our infant world ten thousand eager and observing eyes, to watch for undiscovered wonders in the book of nature, and to contribute from as many sources to the great reservoir of this yet imperfect science.

The elaborate work on Natural History prepared and published by authority of the Legislature of New York, is a significant indication of the importance attributed to this branch of knowledge.

In the preparation of the following work particular pains have been taken to adapt it to the comprehension of beginners: first, by the use of the English names and expressions instead of Latin and Greek; and secondly, by confining the description of animals to the most prominent peculiarities, and such as indicate clearly the reason of their particular classification.

At the end of each class of the vertebrated animals I have added a list of those found in the state of New York, as described by Doctor James E. De Kay, in his Zoology of New York.

With respect to the classification of Mammalia, I have brought the orders of Linnæus, Blumenbach, and Cuvier in accordance, by omitting Cuvier's order of Pachidermata, and putting the Horse, Ass, and Zebra under the order of Solidungula, and the Hog, Tapir, Elephant, Rhinoceros, and River-horse under that of Multungula, but adopting the order Edentata of Cuvier.

In Ornithology I have followed the system of Cuvier; in

Erpetology that of Brongniart ; and as the systematic classification of Fishes is in need of much improvement, I still follow in this department the system of Linnaeus.

In Entomology I have adopted the classification of Linnaeus ; but in Helminthology I have formed out of the numerous orders of Blumenbach, Cuvier, Lamarck, and Oken, only five, for the purpose of simplifying, to beginners, the study of this difficult class.

THE AUTHOR.

New York, May, 1849.

CONTENTS.

	Page.
SECT. I.—Introduction	13
—— II.—Of the Animal Kingdom.....	15
—— III.—I. MAMMALOGY.....	19
—— IV.—Of Man.....	22
—— V.—Of Four-handed Mammalia.....	24
—— VI.—Of Carnivorous Mammalia.....	28
—— VII.—Of Gnawers.....	41
—— VIII.—Of One-hoofed Mammalia.....	45
—— IX.—Of Two-hoofed Mammalia.....	47
—— X.—Of Many-hoofed Mammalia.....	52
—— XI.—Of Toothless Mammalia.....	57
—— XII.—Of Fish-like Mammalia.....	60
List of Mammalia found in the State of New York	63
Sources of Reference for the Natural History of Mammalia.....	64
—— XIII.—II. ORNITHOLOGY.....	65
—— XIV.—Of Birds of prey.....	69
—— XV.—Of Warblers.....	72
—— XVI.—Of Climbers.....	76

	Page.
SECT. XVII.—Of Hen-like Birds.....	78
— XVIII.—Of Long-legged Birds.....	82
— XIX.—Of Swimming Birds.....	83
List of Birds found in the State of New York...	85
Sources of Reference for the Natural History of Birds.....	89
— XX.—III. ERPETOLOGY.....	89
— XXI.—Of Snakes.....	92
— XXII.—Of Lizards.....	98
— XXIII.—Of Tortoises.....	100
— XXIV.—Of Frogs.....	101
List of Reptiles found in the State of New York.	104
Sources of Reference for the Natural History of Reptiles.....	105
— XXV.—IV. ICHTHYOLOGY.....	106
— XXVI.—Of Cartilaginous Fishes with open gills.	108
— XXVII.—Of Cartilaginous Fishes with covered gills.....	111
— XXVIII.—Of Apodal Fishes.....	116
— XXIX.—Of Jugular Fishes.....	117
— XXX.—Of Thoracici.....	118
— XXXI.—Of Abdominal Fishes.....	120
List of Fishes found in the State of New York...	121
Sources of Reference for the Natural History of Fishes.....	124
— XXXII.—V. ENTOMOLOGY.....	125
— XXXIII.—Of Beetles.....	132
— XXXIV.—Of Bugs.....	137

	Page.
SECT. XXXV.—Of Butterflies.....	140
— XXXVI.—Of Net-winged Insects.....	141
— XXXVII.—Of Vein-winged Insects.....	143
— XXXVIII.—Of Two-winged Insects.....	146
— XXXIX.—Of Wingless Insects.....	149
List of some Insects.....	152
Sources of Reference for the Natural History of Insects.....	154
— XL.—VI. HELMINTHOLOGY.....	154
— XLI.—Of Gelatinous Worms.....	158
— XLII.—Of Corals.....	160
— XLIII.—Of Shellfish.....	162
— XLIV.—Of Prickly Worms.....	168
— XLV.—Of Long-bodied Worms.....	170
List of some Worms.....	171
Sources of Reference for the Natural History of Worms.....	172
INDEX	173

CLASS-BOOK OF ZOOLOGY.

SECTION I.

INTRODUCTION.

§ 1. NATURAL HISTORY is the science which treats systematically of all those bodies of which the earth is composed, or which derive their sustenance from it.

It is usually divided into three grand departments, commonly called Mineralogy, Botany, and Zoology.

§ 2. These divisions are based upon differences of character and condition which distinguish the objects to which they respectively relate.

Rocks, earth, metals, etc., termed *inorganic bodies*, are embraced in the science of *Mineralogy*.

Trees, and all other kinds of plants, possessing the principle of *life*, but deprived of both *sensation* and *voluntary motion*, form the particular province of *Botany*.

Animals possessing *life*, *voluntary motion*, and *sensation*, are treated of in the science of *Zoology*.

§ 3. All those bodies which are subject to growth and decay, are called *organic bodies*; as animals and plants. Mineral or inorganic substances are never increased or diminished, except by the application of some external force. In this respect they differ from animals and plants.

§ 4. Organic bodies are further distinguished from inorganic by their power of reproducing, and hence of perpetuating objects like themselves, or their own species. Thus, from the seeds of plants, and the eggs of animals, new plants and animals are produced.

§ 5. As *life* is an essential condition of organic bodies, the instant they die, they become inorganic, and the mat

ter of which they are formed, is subject to the same laws which govern inorganic bodies.

§ 6. All organic bodies derive their sustenance from inorganic matter; that is, their nourishment either is or becomes reduced to this state, before it can contribute to their support.

§ 7. Plants derive their nourishment principally from the soil of the earth; animals, from vegetable, mineral, and animal substances.

§ 8. Animals, although in many respects dissimilar to plants, are like them in certain particulars, such as *nourishment, circulation of fluids, respiration, and propagation.*

§ 9. The *nourishment* of plants is derived by means of absorbing vessels, dispersed through the leaves and root-fibres; and when this nourishment is withdrawn, the plant ceases to live.

§ 10. All plants have a *fluid* called *sap*, which *circulates* through them, in many respects like blood through animals.

§ 11. *Respiration* or breathing is performed in plants through the leaves, which receive a certain portion of the atmosphere. Leaves are compared to the lungs of animals.

§ 12. Plants are provided with organs of *reproduction*, and invariably produce, like animals, objects of their own species. The seeds of plants may therefore be regarded as vegetable eggs, from which objects similar to the parent plants are reproduced.

QUESTIONS ON SECT. I.

- § 1. What is Natural History, and into what departments is it divided?
- § 2. Upon what differences are those divisions based? Explain it.
- § 3. What are organic and inorganic bodies?
- § 4. How are organic bodies further distinguished from inorganic substances?
- § 5. What is an essential condition of organic bodies?
- § 6. From what do organic bodies derive their sustenance?
- § 7. How do plants and animals derive their nourishment?
- § 8. In what respects are animals like plants?
- § 9. By what means is the nourishment of plants derived?
- § 10. What do you know of the sap of plants?
- § 11. How is their respiration performed?
- § 12. How is the propagation of plants similar to that of animals?

SECTION II.

THE ANIMAL KINGDOM.

§ 13. Animals are animate beings, possessing feeling and the power of voluntary motion.

§ 14. Those animals are called *carnivorous*, which derive their food from the animal kingdom; *herbivorous*, which feed on vegetables; and *omnivorous*, which feed on flesh and vegetables.

§ 15. Mind, as shown through reason or instinct, is manifested in every grade of animated life: *reason* is the sole property of man; *instinct*, of animals.

§ 16. Reason is susceptible of improvement and cultivation; and hence the need of education, which is calculated to improve the mental powers.

§ 17. Instinct is a faculty belonging only to animals, by means of which they perform from an internal impulse, and without any instruction, certain actions tending to their own support and that of their offspring; thus the bird builds its nest, and the bee constructs its comb, as perfectly at first as after successive trials.

§ 18. The Animal Kingdom is usually divided into six classes, viz:

I. *Mammalia*, (Mammalia,) or red and warm blooded viviparous animals.

II. *Birds*, (Aves,) or red and warm blooded oviparous animals.

III. *Reptiles*, (Reptilia,) or red and cold blooded oviparous animals, provided with lungs, and destitute of fins: as snakes, lizards, turtles, frogs, etc.

IV. *Fishes*, (Pisces,) or red and cold blooded oviparous animals, provided with fins, and destitute of lungs.

V. *Insects*, (Insecta,) oviparous animals, provided with at least six legs, and destitute of a bony frame; as beetles, locusts, butterflies, wasps, flies, and spiders.

VI. *Worms*, (Vermes,) or soft animals with, or without hard coverings, and destitute of legs; as the rainworm, the shellfish, etc.

§ 19. Zoology is divided into six branches : each branch forming a distinct science ; viz : I. *Mammalogy*, which explains the nature of Mammalia ; II. *Ornithology*, which relates to Birds ; III. *Erpetology*, which describes the Natural History of Reptiles ; IV. *Ichthyology*, which describes the Natural History of Fishes ; V. *Entomology*, which describes the Natural History of Insects ; VI. *Helminthology*, which explains the nature of Worms.

QUESTIONS ON SECT. II.

- § 13. What are animals ?
 § 14. What animals are called carnivorous, herbivorous, and omnivorous ?
 § 15. What faculty is the sole property of man, and which one of animals ?
 § 16. What is reason ?
 § 17. What is instinct ?
 § 18. Into how many classes is the Animal Kingdom divided ? Name them.
 § 19. Into how many branches is Zoology divided ? Name them.

THE ANIMAL KINGDOM.

I. MAMMALOLOGY.

Fig. 1.



THE AMERICAN STAG.—(*Cervus Canadensis*.)

II. ORNITHOLOGY.

Fig. 2.



THE BLUE JAY.—(*Corvus cristatus*.)

III. ERPETOLOGY.

Fig. 3.



THE CHAMELEON.—(*Lacerta Chamæleon*.)

IV. ICHTHYOLOGY.

Fig. 4.

THE TENCH.—(*Tinca vulgaris*.)

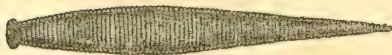
V. ENTOMOLOGY.

Fig. 5.

THE ROVER-BEETLE.—(*Staphylinus olens*.)

VI. HELMINTHOLOGY.

Fig. 6.

'THE LEECH.—(*Hirudo medicinalis*.)

SECTION III.

I. MAMMALOGY.

§ 20. Mammalia, or warm-blooded viviparous animals, may be divided into the following nine orders, viz:

1st Order—	Two-handed Mammalia :	(Bimanus.)
2d	“ Four-handed	“ (Quadrumana.)
3d	“ Carnivorous	“ (Carnivora.)
4th	“ Gnawers	“ (Glires.)
5th	“ One-hoofed	“ (Solidungula.)
6th	“ Two-hoofed	“ (Bisulca.)
7th	“ Many-hoofed	“ (Multungula.)
8th	“ Toothless	“ (Edentata.)
9th	“ Fish-like	“ (Cetacea.)

Mammalia :

1st Order.—MAN: (*Homo Sapiens.*)

2d Order.—FOUR-HANDED MAMMALIA.

Fig. 7.



THE MONKEY.—(*Tarsus Bancanus.*)

3d Order.—CARNIVOROUS MAMMALIA.

Fig. 8.

THE GRIZZLY BEAR.—(*Ursus ferox*.)

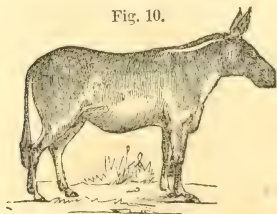
4th Order.—GNAWERS.

Fig. 9.

THE WATER-RAT.—(*Arvicola amphibius*.)

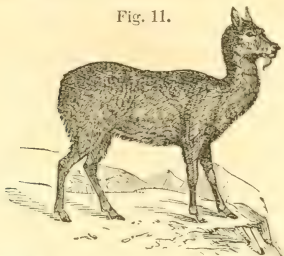
5th Order.—ONE-HOOFED MAMMALIA.

Fig. 10.

THE WILD ASS.—(*Equus Hemionus*.)

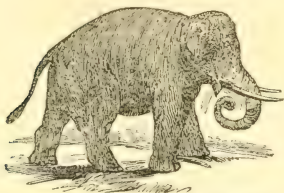
6th Order.—TWO-HOOFED MAMMALIA.

Fig. 11.

THE MUSK.—(*Moschus moschiferus*.)

7th Order.—MANY-HOOFED MAMMALIA.

Fig. 12.

THE ASIATIC ELEPHANT.—(*Elephas Indicus*.)

8th Order.—TOOTHLESS MAMMALIA.

Fig. 13.

THE DUCK-BILL.—(*Ornithorhynchus paradoxus*.)

9th Order.—FISH-LIKE MAMMALIA.

Fig. 14.

THE BLACK WHALE.—(*Balæna Mysticetus*.)

SECTION IV.

1st Order—MAN: (*Bimanus*.)

§ 21. *Man* is the most perfect being among the living creatures on earth: the exclusive possession of *reason* and *speech*, the power of *walking erect*, the relative proportion of his *thighs* and *arms*, the *wide soles* of his feet, and the facility with which he uses *two perfect hands*, distinguish him from all the lower animals.

§ 22. But as climate and mode of life, in the different countries of the world, have caused different colors and features, the human species may be divided into the *White*, the *Mongolian*, the *Ethiopic*, and the *Malayan Varieties*.

§ 23. The *White Variety* is also called the *Caucasian Variety*, because it took its origin from the numerous tribes still existing in the *Caucasus*; as the *Alanes*, the *Avares*, the *Circassians*, etc.

§ 24. The *White Variety* is distinguished by a white skin; florid cheeks; long, soft brown hair, more or less dark, and curled; and a bony head, which presents the finest intellectual organization.

§ 25. The *Caucasian Variety* includes all the *Europeans* and their descendants, (with the exception of the *Laplanders*,) the *Tartars*, the *Caucasians*, *Persians*, *Jews*, *Turks*.

the East Indians of the higher castes, and the Northern Africans from Egypt to Morocco.

§ 26. The Caucasian Variety is highly distinguished for their superior mental power; which is evinced in their advancement in the arts and sciences.

§ 27. The *Mongolian Variety* are mostly of a pale yellow color, like dried lemon-peel, with harsh, black hair, half-closed eyelids, a flat face, and a projection of the cheek-bones.

§ 28. This Variety includes the Laplanders in Europe; the Esquimaux in America, extending from Behring's Strait to Labrador; the wandering tribes of Central and Northern Asia, as the Mongols, Nogays, Calmuks, Burates, Tungoses, Samoyedes, Coriaks, Kamtschatkadales; the inhabitants of China, Japan, and Thibet.

§ 29. The *Ethiopian Variety* are black in a greater or less degree, with black frizzly hair, jaws projecting forwards, thick lips, and flat nose. All the natives of Africa, not included in the first Variety, belong to this.

§ 30. The *Malayan Variety* are of a brown color, from a clear mahogany to the darkest chestnut-brown, with thick, black, bushy hair, a broad nose, and wide mouth; and includes the inhabitants of Malacca, Sumatra, Java, Borneo, Celebes, New Holland, New Guinea, New Zealand. Most of these nations speak the Malay language.

QUESTIONS ON SECTS. III., IV.

20. Into how many Orders are Mammalia divided? Name them.
21. Why is man the most perfect being?
22. Into how many varieties is the human species divided? Name them.
23. Why is the White Variety called the Caucasian?
24. By what external marks is the Caucasian Variety distinguished?
25. What nations does it include?
26. How is it distinguished with respect to mental faculties?
27. Describe the features and color of the Mongolian Variety.
28. What nations does this Variety include?
29. What do you know of the Ethiopian Variety?
30. What are the features, color, and native countries of the Malayan Variety?

SECTION V.

2d Order—FOUR-HANDED MAMMALIA : (*Quadrumana*.)

§ 31. *Quadrumana* are all those mammalia, the fore as well as the hind feet of which are formed like the hands of man, having each a thumb and four fingers with flat nails ; as orang-outangs, baboons, guenons, monkeys, and makies.

§ 32. *Quadrumana* approach the nearest to man in *structure, actions, and forms* ; but they are deprived of the organs of speech, and are unable to stand and walk easily upright on account of the flatness of their hips.

§ 33. They are natives of the countries only between the tropics ; and are generally herbivorous ; but when domesticated, omnivorous.

§ 34. The use of them to man is their flesh, which in some countries is eaten ; their skin as leather, and their exhibition in menageries as a curiosity.

§ 35. They may be divided, according to their external forms, into five distinct families, viz :

1. Tailless apes ; 2. Short-tailed apes or baboons ; 3. Long-tailed apes or guenons ; 4. Monkeys ; and 5. Cat-like or makies.

§ 36. Family I. The *Tailless Ape* (*Simia*) resembles man the most, and inhabits the tropics of Asia and Africa.

§ 37. Family II. The *Short-tailed Ape* (*Cynocephalus*) is an ape with a very short tail, and a dog-like face. He inhabits the tropics of the Old Continent.

§ 38. Family III. The *Long-tailed Ape*, or Guenon, (*Cerropithecus*) is provided with cheek-pouches, which he can fill with provisions ; and with a very long but not prehensile* tail. He is a native of the tropics of Asia and Africa.

§ 39. Family IV. The *Monkey* (*Cebus*) is destitute of cheek-pouches, but is provided with a long prehensile

* Seizing ; grasping ; adapted to seize or grasp.

tail, with the exception of a few species. He is a native of the tropics of America.

‡ 40. Family V. The *Cat-like Ape*, or Makie, (Lenur,) has a round head like a cat, and is a native of Madagascar, and the neighboring isles.

‡ 41. Those most known of the family of the tailless apes are: 1. The orang-outang; 2. The Barbary ape; and 3. The Chimpanse.

‡ 42. The *Orang-outang* (*Simia Satyrus*) is of the size of a small boy; the hair of his body is of a reddish brown, and his face of a bluish color; his ears and hands are bare. He is principally found in the island of Borneo. This ape is seldom seen in menageries, as a change of climate does not agree with his delicate constitution: he is gentle and mild, but not as docile as a dog.

‡ 43. The *Barbary Ape* (*Simia Sylvanus*) is of the size of a child four years old; the hair of his body is of a greenish brown color; he is found in large troops in Northern Africa, upon trees; where he feeds on fruits, worms, ants, and other insects. This ape is often seen in menageries.

‡ 44. The *Chimpanse* (*Simia Troglodytes*) is almost as large as a man, with long arms extending as far down as the knees; the hair of his body is dark brown; and the face and hands are bare and flesh-colored. It is found in the interior of Africa upon bread-fruit-trees, is easily domesticated, and is the most perfect of this family.

‡ 45. The best known species of short-tailed apes are: 1. The Ribbed-faced Baboon; 2. The Mandrill; and 3. The Bear-like Baboon.

‡ 46. The *Ribbed-faced Baboon* (*Cynocephalus Mormon*) is near five feet high, has a singular appearance from the bright-colored streaks upon and at the sides of the nose, and a yellow beard; the hair of his body is dark gray below, and yellow above; he is a native of Ceylon, is wild and unmanageable, and often seen in menageries.

‡ 47. The *Mandrill* (*Cynocephalus Maimon*) is about four feet high, has a face of bluish, and a body of light brown color; he is found from Guinea to the Cape of

Good Hope; where whole droves of them plunder the vineyards and orchards; he is often seen in menageries.

‡ 48. The *Bear-like Baboon* (*Cynocephalus ursinus*) is about four feet long, shaggy and black, and the common baboon at the Cape of Good Hope, where he plunders orchards and gardens; he is often seen in menageries.

‡ 49. Of the Long-tailed Apes, the *Macaco* (*Carcopithecus Cynomolgus*) is the most frequently seen in menageries; he is longer than a cat, above greenish, below yellowish white, and is a native of the western coast of Africa; where large troops of them plunder the plantations.

‡ 50. Of monkeys the most remarkable are: 1. The Red Preacher; 2. The Coaita; 3. The Capuchin; 4. The Squirrel Monkey; 5. The Fox Monkey; and 6. The Ouistiti.

‡ 51. The *Red Preacher* (*Cebus Seniculus*) is of the size of a small bulldog, of a reddish brown color, with large whiskers, and found in troops upon the trees in the forests of Guiana. He usually emits a deafening voice, principally on change of weather; which sound is produced by a remarkable long cavity in the windpipe.

‡ 52. The *Coaita* (*Cebus paniscus*) is larger than a cat, entirely black, found everywhere in South America, and extremely dexterous in the use of its long prehensile tail.

‡ 53. The *Capuchin* (*Cebus Capucinus*) is a monkey as large as a big cat, his body dark brown, with a white ring around the face, looking like a Capuchin Friar. His voice resembles that of a crying child. He is found in large numbers in Guiana, upon the trees in the forests.

‡ 54. The *Squirrel Monkey* (*Cebus sciureus*) is larger than a gray-squirrel, covered with short yellow gray hair, with a black snout: a very common and gentle little animal.

‡ 55. The *Fox Monkey* (*Cebus Pithecia*) is of the size of a small fox; his fur is black and shaggy, and around the face white; he is found in Guiana.

‡ 56. The *Ouistiti* (*Cebus Jacchus*) is of the size of

a squirrel, has a black-colored body, and a very bushy ringtail. He is found in the warmest parts of America.

§ 57. Of the Cat-like Apes, the most common is the *Maki*, (Lemur Mongos,) which has a black head, a gray body and tail. He lives upon trees in Madagascar, and is herbivorous.

QUESTIONS ON SECT. V.

- § 31. What are Four-handed Mammalia?
- § 32. In what respect do they resemble man, and how do they differ from him?
- § 33. Of what country are they natives, and on what do they feed?
- § 34. What is their use?
- § 35. Into how many families are they divided, and what are their names?
- § 36. Describe the Tailless Apes.
- § 37. Describe the Tailless Baboons.
- § 38. What are Long-tailed Apes?
- § 39. What Apes are called Monkeys?
- § 40. What are called Cat-like Apes?
- § 41. Which are the most remarkable Tailless Apes?
- § 42. What do you know of the size, color, nature, and native place of the Orang-outang?
- § 43. What do you know of the size, color, nature, and native place of the Barbary Ape?
- § 44. What do you know of the size, color, nature, and native place of the Chimpanse?
- § 45. Which are the best-known species of Short-tailed Apes?
- § 46. What is the size, color, habit, and native country of the Ribbed-faced Baboon?
- § 47. What is the size, color, habit, and native country of the Mandrill?
- § 48. Describe the Bear-like Baboon.
- § 49. What Long-tailed Ape is the most frequently seen in menageries? Describe him.
- § 50. Which are the most remarkable Monkeys?
- § 51. What is the size, color, nature, and native place of the Red Preacher?
- § 52. What is the size, color, nature, and native place of the Coaita?
- § 53. What is the size, color, nature, and native place of the Capuchin Monkey?
- § 54. What is the size, color, nature, and native place of the Squirrel Monkey?
- § 55. What is the size, color, nature, and native place of the Fox Monkey?
- § 56. What is the size, color, nature, and native place of the Ouistiti?
- § 57. Which is the most common of the Cat-like Apes? Give a description of him.

SECTION VI.

3d Order—CARNIVOROUS: (*Mammalia*.)

§ 58. *Carnivora* are those quadrupeds which take their food from the animal kingdom, and possess, like man and quadrumana, the three kinds of teeth, viz: Incisors, canine teeth, and grinders.

§ 59. The intestines of this order are shorter and less voluminous than those of herbivorous quadrupeds, on account of the substantial nature of their aliment, and to avoid the putrefaction it would undergo by remaining too long in an elongated canal.

§ 60. The carnivora, according to their external and internal constitution, may be divided into *five families*, viz: 1. Hand-winged; 2. Insect-eaters; 3. Flesh-eaters; 4. Amphibious Flesh-eaters; 5. Pouched Flesh-eaters.

§ 61. Family I. The *Hand-winged*, or *Bats*, (*Chiroptera*.) are those nocturnal animals the fore and hind feet of which are connected by a thin membrane, which enables them to fly, but makes them unfit for walking on the ground.

§ 62. Family II. *Insect-eaters* (*Insectivora*) are small *Mammalia*, which lead a nocturnal subterranean life, feed principally on insects, and in cold climates pass the winter in a torpid state.

§ 63. Family III. *Flesh-eaters* (*Carnivora*) feed exclusively on flesh, which they procure by means of their capability of seizing and devouring other animals.

§ 64. Family IV. *Amphibious Flesh-eaters* (*Amphibia Carnivora*) have so short legs, which are so enveloped in their skin, that they can only crawl on land; but as their feet are webbed, they are excellent swimmers, and live more in water than on land.

§ 65. Family V. *Pouched Flesh-eaters* (*Marsupialia*) are those animals, the females of which have a large pouch (*Marsupium*) on the under part of the body, which can be opened and closed at pleasure by particular muscles. Their young ones are born small beyond all proportion,

and carried in this pouch for a length of time, continuing to suck until they become more perfectly formed.

§ 66. Among the *Hand-winged Carnaria*, may be mentioned the following species :

§ 67. The *New York Bat* (*Vespertilio Noveboracensis*) is three inches long, reddish brown, found in New York, Pennsylvania, Ohio, and Missouri, and useful in devouring noxious insects.

§ 68. The *Carolina Bat* (*Vespertilio Carolinensis*) is chestnut brown above, yellow below, found in Carolina, and a good destroyer of insects.

§ 69. The *Hoary Bat* (*Vespertilio pruinosus*) is four and a half inches long, blackish and white, and found at the Rocky Mountains.

§ 70. The *Arcuated Bat* (*Vespertilio arcuatus*) is five inches long, chestnut brown, with ears arcuated, and found at the Rocky Mountains.

§ 71. The *Subulate Bat* (*Vespertilio subulatus*) is blackish, with pointed ears, and found at the Rocky Mountains.

§ 72. The *Vampire* (*Vespertilio spectrum*) is of the size of a ground-squirrel, and reddish brown. It proves very troublesome by sucking the blood, not only of the larger Mammalia, but also of men, when asleep, whom it attacks at the toes. It is a native of South America.

§ 73. The *Flying Dag* (*Pteropus vulgaris*) is as large as a cat, and dark brown. His flying membranes, when extended, measure six feet. It is more herbivorous than carnivorous, and is found in troops in Hindostan, and the Indian and Australian islands. The flesh is eatable.

§ 74. Among the *Insect-eaters* may be mentioned the following species. The *Small Shrew* (*Sorex parvus*) is the smallest mammiferous animal, only two inches long, brownish ash-colored ; has a conical head, short ears and feet. Its elongated head resembles that of the mole ; its legs and tail, that of the mouse. It is a native of the Rocky Mountains, feeds on insects and grain, lives in holes, and is called the venomous mouse, on account of its offensive odor.

§ 75. The *Shrew Mole* (*Scalops Canadensis*) is six inches long, and of a dark lead-color. Its head is elon-

gated, the snout cartilaginous, its eyes are exceedingly small, feet very short, and the anterior terminating in large strong hands with fingers, armed with long, flat linear nails, for the purpose of digging. It is found from Canada to Virginia, in high grounds, where it makes burrows and numerous galleries. It feeds exclusively on earth-worms, larvæ, grubs, and other insects.

¶ 76. The *Star-nose Mole* (*Condylura cristata*) is six inches long, of a dark lead-color. It has a conical head, terminating in a snout, which is encircled by a cartilaginous disk, consisting of twenty rays. It feeds only on insects, grubs, and worms; is therefore useful to the husbandman, and is found near the banks of rivulets in North America.

¶ 77. The *Hedgehog* (*Erinaceus Europæus*) is of the size of a rabbit, covered with yellowish prickles, feet and tail very short, and is found almost in the whole of the Old World. It is a nocturnal animal, feeds both on animals and vegetables; mouses like a cat. It sticks its prickles into fruit for the purpose of bringing it to its holes; and is gentle, easily tamed, and kept in rooms.

¶ 78. Among the flesh-eaters, the following species deserve to be noted, viz: The *Racoon* (*Procyon Lotor*) is of the size of a fox, has a short triangular head, feet provided with long and strong nails, fit for climbing, a long pointed tail, with dark rings around its body. The *Racoon* is a nocturnal animal, inhabiting the warmer parts of the Union, feeds on a variety of substances, uses its fore paws very dexterously for seizing, or even sucking up its food. It is in general very tame. Its flesh is eatable, and its hair is esteemed by the hatters next in value to that of the beaver.

¶ 79. The *Bear* is a carnivorous animal with a large head, a muzzle terminating in a moveable cartilage, with incurved large strong nails, callous soles of the hind feet, and a short tail. Bears are found in the mountainous countries of the Old and New World. When young, they live principally on fruit and other vegetables; but after they are three years old, they become omnivorous. Their fur and flesh are much esteemed.

When full-grown, one often weighs upwards of four hundred pounds.

§ 80. The *Black Bear* (*Ursus Americanus*) and the *Grizzly Bear* (*Ursus horribilis*) are natives of the United States.

§ 81. The *White* or *Polar Bear* (*Ursus maritimus*) is found on the coast and islands of the northern parts of the world. It is twelve feet long, and weighs fifteen hundred pounds; it swims and dives with great facility for catching fish and seals. It is a dangerous animal, and hunted on account of its fat and fur.

QUESTIONS ON SECT. VI.

58. What are carnivorous Mammalia?
59. Why are their intestines shorter, than in herbivorous Mammalia?
60. Into how many families may the Carnivorous Mammalia be divided? Name them.
61. Describe Bats.
62. Describe Insect-eaters.
63. Describe Flesh-eaters.
64. Describe Amphibious Flesh-eaters.
65. Describe Pouched Flesh-eaters.
66. Name some species of Bats.
67. Describe the New York Bat.
68. Describe the Carolina Bat.
69. Describe the Hoary Bat.
70. Describe the Arcuated Bat.
71. Describe the Subulate Bat.
72. Describe the Vampire.
73. Describe the Flying Dog.
74. Describe the Small Shrew.
75. Describe the Shrew Mole.
76. Describe the Star-nose Mole.
77. Describe the Hedgehog.
78. Describe the Racoon.
79. Describe the Bear. On what do they feed, and of what use are they?
80. What Bears are natives of the United States?
81. Describe the Polar Bear.



(SECTION VI. CONTINUED.)

§ 82. The *Glutton* (*Gulo luscus*) is a little more than two feet long, of a chestnut-brown color, with a whitish

tint between the eyebrows and ears; and found, as it is capable of enduring the severest frost, in the woods and barren grounds from Labrador to Hudson's Bay, as well as in Siberia. It is destructive to all animals, but principally to the beaver and fox, and is called Glutton on account of its voracity. This animal is strong and fierce, and was seen to take away from a wolf the carcass of a deer, but it is easily tamed. The fur is of considerable value to the fur-traders.

§ 83. The *American Badger* (*Meles Labradoria*) is two feet and a half long, has long hair of a grayish color, a conical head, with an elongated muzzle, and short limbs; but the fore feet longer, and adapted for burrowing deep and extensive excavations, where several individuals of them dwell, but from which they can be brought by the aid of smoke and dogs. It feeds on fruit, insects, frogs, and other small animals, sleeps during the winter, and is found on the Missouri and Columbia rivers, and as far as Labrador.

§ 84. Those carnivorous animals which have a smooth tongue, and on the fore feet five, but on the hind feet only four, round not retractile nails, compose the genus *Dog*, usually called the *Canine Race*; as the *Dog*, the *Wolf*, the *Fox*, and the *Jackal*.

§ 85. The *Dog* (*Canis familiaris*) is the most faithful companion of man, distinguished for the acuteness of his senses, for his great docility and important services, and dispersed with him over all the five portions of the globe.

§ 86. It is difficult to decide whether the different races of dogs are varieties of one and the same species, or whether they are derived from the wolf, fox, or jackal. Wild dogs are found nowhere, and many believe that the dog is a descendant of the wolf or the fox; but in spite of the similarity between these animals, there are several arguments against this opinion, for

§ 87. 1. Dogs, wolves, and foxes have a natural aversion to each other; and even when brought together, when very young, they do not continue to live in harmony, but evince a hostile disposition towards each other after they are grown.

2. The dog will never eat the flesh of a killed wolf, but the wolf will.

3. It seems more probable that the dog is a descendant of the jackal, because their natural dispositions are more similar.

§ 88. The disease to which dogs are sometimes subject, and according to which they become rabid, and communicate the same to every being they bite, is called *hydrophobia*.

§ 89. Want of food and sufficient clean water, ill-treatment, excessive fatigue, or the bite of another rabid dog, are usually the causes of hydrophobia in the canine race.

§ 90. The most efficacious remedy for hydrophobia is said to be a decoction, made of the leaves and stems of the Dyer's Broom, (*Genista tinctoria*,) drank freely during three days; after which time there will appear under the tongue a number of blisters, filled with a yellowish-green substance, which should be opened, and the mouth then cleansed with the same decoction.

§ 91. The *Common Wolf* (*Canis lupus*) is of the size of the largest dog, has yellowish-gray short hair, a black stripe on the fore-feet, and is found in the northern parts of the whole world. When hungry, it digs up newly-buried bodies, and its appearance in churchyards at night may probably have given rise to the stories of the *Man-Wolf*.

§ 92. The *Barking* or *Prairie Wolf* (*Canis latrans*) is three feet and a half long, and of a gray color. It barks like a dog, and frequents the prairies of the West, following in great numbers the herds of buffaloes. Its fur is much used.

§ 93. The *Dusky Wolf* (*Canis nubilus*) is three and a half feet long, of a dusky color, and a native of Missouri. Its fur is used.

§ 94. The *Black Wolf* (*Canis Lycaon*) is about three feet long, black color, and an inhabitant of Missouri, Oregon, and the British possessions of North America. Its fur is valuable.

§ 95. The *Fox* (*Canis Vulpes*) is of the size of a small dog; its fur is reddish brown; it is a native of the north-

ern parts of the Old and New World. Its fur is valuable to furriers.

§ 96. The *Arctic Fox* (*Canis Lagopus*) is white, and an inhabitant of the highest northern latitudes of America and Asia. Its fur is excellent.

§ 97. The *Silver Fox* (*Canis argentatus*) is of a lustrous black color, very rare, and found in Oregon and farther north. Its fur is considered so precious that a fine skin of a Labrador silver fox has been sold in London for five hundred dollars.

§ 98. The *Gray Fox* (*Canis cineres-argentatus*) is very common in Pennsylvania and other surrounding States.

§ 99. The *Swift Fox* (*Canis velox*) is the smallest fox, of a reddish-gray color, and called so on account of its extraordinary swiftness.

§ 100. The *Jackal* (*Canis aureus*) is of the size of a small dog, and of a dirty yellow color. It is found in Transcaucasia, as well as in Africa, where it prowls in troops, eats gazelles and other animals, and digs up dead bodies. As it can be easily tamed, and has the same disposition as the dog, it may be considered as the original stock of the dog.

§ 101. The *Striped Hyena* (*Hyæna striata*) differs from the canine race, having only four nails on each foot, a rough tongue, and a short tail. It is of the size of a large dog, gray, with brown stripes, and is an inhabitant of Asia and Africa. Its den is underground or in the cavities of rocks; it is very fierce and fond of dead bodies, which it digs up. It is frequently seen in menageries.

§ 102. The *Spotted Hyena* (*Hyæna crocuta*) is much larger than the striped. It is met with in great numbers in Abyssinia, and thence southward as far as the Cape of Good Hope. It has the same habits as the striped hyena, and is also often seen in menageries.

§ 103. The genus *Weasel* (*Mustela*) is distinguished from the other carnivorous animals by having a head like a fox, a tall, thin, and stretched body, a tail like a cat, and a smooth tongue.

§ 104. They destroy poultry and birds, and make war against rats, mice, and even serpents.

§ 105. All these animals have a disagreeable odor, which proceeds from peculiar glands, and which is stronger in summer than in winter. When irritated, their smell is perceived at a considerable distance.

§ 106. Weasels are found in all parts of the globe, but always more abundantly in the northern latitude. Their fur is of some value.

§ 107. The principal species of the genus weasel, found in the United States, are—1. The Ermine Weasel; 2. The Pine Marten; 3. Pennant's Marten; 4. The Mink; 5. The Sable.

§ 108. The *Ermine Weasel* (*Mustela erminea*) is almost as large as a cat; is brown in the summer, but in winter white, and very abundant in the most northern parts of America, as well as in Asia. Farther north it is called Stoat. The white skins of this animal are readily sold for from ten to fifteen dollars per hundred.

§ 109. The *Pine Marten* (*Mustela Martes*) is about one foot and a half long, of a brilliant brown color over the whole of the body, with the exception of the throat and breast, which is yellow, and resides usually in the lofty tops of pine-trees in the northern parts of America, Asia, and Europe.

§ 110. The beautiful fur of the *Pine Marten* comes nearest that of the Sable, and is extensively used. The Hudson's Bay Fur Company sold in one year 14,000 skins, and the French sent from Canada 30,325 of them at the same time.

§ 111. *Pennant's Marten* (*Mustela Pennanti*) is two feet long, without the tail, and of a blackish-brown color; found from Pennsylvania to the higher northern parts of America. Its fur is much esteemed, and large numbers of skins are exported from America to England.

§ 112. This animal received its name from John Erxleben, Professor of Natural History at Gottingen, to immortalize the name of Thomas Pennant, a distinguished philosopher, and author of several works.

§ 113. The *Mink* (*Mustela Lutreola*) is twenty inches long, without the tail, of a chestnut-brown color; lives on the banks of streams from Carolina to Hudson's Bay, and

feeds on fish, frogs, poultry, rats, mice, and eggs of tortoises. Its fur is used by the hatters.

§ 114. The *Sable* (*Mustela Zibellina*) is eighteen inches long, without the tail, of a brown color; an inhabitant of Siberia and Kamtschatka, but very rare in North America.

§ 115. The fur of Sables is considered the most valuable kind; the price of a single skin is from five to fifty dollars. The blackest are reputed the best. The finest come from Nertchinsk and Jakuzk, in Siberia.

§ 116. The *Polecat*, or *Skunk*, (*Viverra Mephitis*.) is of the size of a cat, of white color, mixed with black, irregularly varying in different individuals, has a rough tongue, and is found from Buenos Ayres to Canada.

§ 117. The *American Otter* (*Lutra Brasiliensis*) is about five feet long, including the tail, of a glossy brown color, and inhabits South as well as North America, as far as the Coppermine River, 65° N. lat.

§ 118. In the Southern, Middle, and Eastern States, but principally on the Missouri, they are very common.

§ 119. Though the *Otter*, on account of its stretched body and cat-like tail, is similar to the weasel, it differs from it in having webbed feet, for the purpose of swimming.

§ 120. It feeds almost entirely upon fish. The fur of the *Otter* is much valued by the hatters, and is much used in Russia for lining cloaks and overcoats.

QUESTIONS ON SECT. VI.

- § 82. Describe the Glutton.
- § 83. Describe the American Badger.
- § 84. What animals compose the Canine race?
- § 85. Describe the Dog.
- § 86. Are the different races of the Dog varieties?
- § 87. What are the arguments against the opinion, that the Dog is a descendant of the wolf or fox?
- § 88. What is Hydrophobia?
- § 89. What are the causes of Hydrophobia?
- § 90. What is said to be the most efficacious remedy for it?
- § 91. Describe the Common Wolf.
- § 92. Describe the Barking Wolf.
- § 93. Describe the Dusky Wolf.
- § 94. Describe the Black Wolf.
- § 95. Describe the Common Fox.
- § 96. Describe the Arctic Fox.

97. Describe the Silver Fox.
98. Describe the Gray Fox.
99. Describe the Swift Fox.
100. Describe the Jackal.
101. Describe the Striped Hyena.
102. Describe the Spotted Hyena.
103. How is the genus Weasel distinguished?
104. What is their natural disposition?
105. What do you know of their disagreeable odor?
106. Where are they found?
107. Which are the principal species of Weasels found in the United States?
108. Describe the Ermine Weasel.
109. Describe the Pine Marten.
110. What do you know of its fur?
111. Describe Pennant's Marten.
112. Why, and by whom received it this name?
113. Describe the Mink.
114. Describe the Sable.
115. What can you say of its fur?
116. Describe the Polecat.
117. Describe the American Otter.
118. Where are they very common?
119. How does it differ from the Weasel?
120. On what does it feed, and of what use is it?

(SECTION VI. CONTINUED.)

§ 121. The *Common Cat* (*Felis Catus*) and the wild cat belong to the same species: the former sometimes become wild, and the latter can be easily tamed. Cats are found in all climates, and existed in America before its discovery, for a hunter brought one of them to Christopher Columbus, which was of a brownish gray color. Among the peculiarities of the cat, are its powerful electricity; the shining of its eyes in the dark; its singular love of certain plants, such as catnep; its purring, and the strong invincible antipathy of many individuals to it. The principal varieties are the *Angora Cat*, with long silky hair; the bluish-gray *Cyprus Cat*; and the *Tortoise-shell Cat*, which are often of three colors, black, white, and yellowish brown, equally distributed in large spots.

§ 122. The *Lion* (*Felis Leo*) is five, and its tail two feet long, which is ornamented with a tassel. He is of a dirty yellow color, and a native of Africa and Western

Asia. The number of lions in those countries was more considerable in ancient times than now, and the diminution of them can only be attributed to the increase of the number of mankind. Sylla the Dictator exhibited a hundred, Cæsar four hundred, and Pompey six hundred lions in the grand circus in Rome; and the first person in that city who caused them to be yoked, so as to draw a carriage, was Marc Antony, who appeared in the streets in a chariot drawn by lions. It is not extraordinary to see tamed lions also in our own menageries.

§ 123. The *Tiger* (*Felis Tigris*) is from five to six feet long, of a pale yellow color, striped with great regularity, and found only in Asia, from Bengal to China. Its skin is much valued.

§ 124. The *Panther* (*Felis Pardus*) is about five feet long, of a pale yellow color, elegantly marked with black spots, and a native of Africa and the East Indies.

§ 125. The *Jaguar* or *American Tiger* (*Felis Onca*) is five feet long, of a pale yellow color with black spots, and resides in the warmer countries of America. The *Jaguar* is very dangerous, never loses his ferocity, and has frequently killed those who have domesticated him.

§ 126. The *Cougar* or *American Lion* (*Felis concolor*) is five feet long, of a brownish yellow color, or a mixture of red and blackish, and is found in the warmer parts of the United States. The *Cougar* is very destructive to deer, hogs, sheep, cows, and calves. He climbs trees with surprising facility, and in that way he is enabled to drop suddenly upon any animal that passes.

§ 127. The *Northern Lynx* (*Felis Canadensis*) is two feet and a half long, of a deep reddish color, marked on the flanks with small oblong spots and black tufts on the ears. It is found only in the northern regions of both continents; but principally southwest of the Hudson's Bay settlements. The *Lynx*, called sometimes wild-cat, has a highly esteemed fur; in one year 9,000 skins were sent by the Hudson's Bay Company to Europe.

§ 128. Among amphibious flesh-eaters may be mentioned the following. The *Walrus*, or *Morse*, or *Sea-cow*, by each of which names it is sometimes called, (*Trichechus Rosma-*

rus,) attains the size of an ox, being from twelve to fifteen feet in length, and from eight to ten feet in circumference. It weighs from 1,500 to 2,000 pounds, and produces from one to two barrels of oil. Its body is cylindrical, covered all over with short reddish-gray hair, its tail very short; its elephant-like tusks, which are the prolonged canine teeth, are from ten to twenty inches, weighing from five to ten pounds, and esteemed as the best of ivory. It resides on the floating ice about the North Pole, and feeds on sea-weed and shellfish, which it detaches with its long tusks. The skin, which is about an inch thick, is used by the Esquimaux for the covering of their tents. They feed upon its flesh with eagerness and gluttony. The ivory tusks and the oil of this animal are articles of commerce.

§ 129. The *Manati* (*Trichechus Manatus*) is found in the rivers and on the coasts of the warmer parts of the world, and abounds on the Orinoco, in South America.

§ 130. The *Common Seal*, or *Sea-calf*, or *Sea-dog*, (*Phoca Vitulina*,) has five palminated toes on each foot, its color is yellowish gray, spotted with brown and blackish, its length from five to six feet, and is found in all the northern seas of the world.

§ 131. The *Seal* is a creature of great importance to the Kamtschatkadales, Greenlanders, and the Esquimaux of Labrador; for they live on its flesh, clothe themselves with their skins, build their huts, and make their canoes of them. Its chase forms their principal business, and their success in it is at once their fortune and glory. The *Seal* is susceptible of a remarkable degree of education. Though fierce, it is easily tamed and harmless, becomes much attached to its owner, and learns to perform several tricks. The oil and skins of seals are articles of commerce. One ship has been known to obtain a cargo of five thousand skins, and upwards of a hundred tons of oil.

§ 132. The *Ursine Seal* (*Phoca ursina*) is eight feet long, of a black color, weighs about eight hundred pounds, and is found on the western shores of North America and Kamschatka.

§ 133. The *Sea-lion* (*Phoca jubata*) has its name from the lion-like mane of the male, and is found in the whole of the Pacific Ocean.

§ 134. The *Sea Elephant* (*Phoca proboscidea*) is thirty feet long, has its name from the proboscis-like nose of the male, and lives in the southern islands of the Atlantic and Pacific Oceans.

§ 135. The *Pouched Flesh-eaters* contain the *Opossum* (*Didelphis Virginiana*) which is of the size of a cat, body blackish gray, ears white and black, soft, large, and entirely bare, mouth very wide, tail bare and prehensile, hind feet like hands. The *Opossum* is a native of North America, and feeds on birds and their eggs, as well as fruit. Its flesh is palatable.

§ 136. The *Kangaroo* (*Halmaturus giganteus*) is larger than a sheep, of a reddish-brown color, tail three feet long, and a native of New Holland. The *Kangaroo*, when sitting upright, is as high as a man, and weighs one hundred and forty pounds. It lives together in herds of fifty or more; is altogether herbivorous; and moves by leaps of full twelve feet at a time. The young, when born, is scarcely half as large as a mouse, but is carried in the pouch three-quarters of a year, until it weighs nearly 14 pounds. They become easily tame, and may be seen in almost all the menageries.

QUESTIONS ON SECT. VI.

§ 121. What do you know of the wild and domestic Cat, their native country, peculiarities, and varieties?

§ 122. Describe the Lion, and some remarkable facts relating to him.

§ 123. Describe the Tiger.

§ 124. Describe the Panther.

§ 125. Describe the Jaguar.

§ 126. Describe the American Lion.

§ 127. Describe the Northern Lynx.

§ 128. Describe the Moose.

§ 129. Describe the Manati.

§ 130. Describe the Common Seal.

§ 131. Of what importance is it to many nations, and what is its natural disposition?

§ 132. Describe the Ursine Seal.

§ 133. Describe the Sea-lion.

§ 134. Describe the Sea-elephant.

§ 135. Name the Pouched Flesh-eaters.

§ 136. Describe the Kangaroo.

SECTION VII.

4th Order.—GNAWERS: (*Glires.*)

§ 136. The *Gnawers* are distinguished from the other Orders of Mammalia by having four front teeth in both jaws, which are separated from the grinders by a void space, and no canine teeth.

§ 137. The absence of canine teeth in this Order, is an indication that they take their food from the vegetable kingdom, as we see in the beaver, squirrel, porcupine, hare, rabbit, etc.

§ 138. An animal, which has four incisors in both jaws, no canine teeth, a flat compressed tail, and a glandulous follicle on the lower part of the body containing the castoreum, is called a *Beaver*, (*Castor Fiber.*) The castoreum obtained from those glandulous pouches of the Beaver, contains from two to three ounces, and is much used in medicine; but it must not be confounded with castor-oil, which is a vegetable production. The Beaver is about four feet long, the tail included, of a chesnut-brown color, weighs about fifty pounds, and is found near the banks of rivers, in the most retired places of Arkansas, Missouri, Michigan, Canada, and Siberia. The Beaver is celebrated for his surprising instinct, according to which he constructs his artificial dwellings. He is, notwithstanding, very stupid, and shows no personal industry nor attachment, when domesticated, though always very gentle and peaceable. The Beaver is everywhere violently persecuted on account of the castoreum, and its most precious fur, used by hatters and furriers. Its tail is considered as good food.

§ 139. The *Muskrat*, (*Ondatra Americana*), a native of North America, is of the size of a rabbit, with reddish-brown long fine hair, a long compressed tail almost bare, and small glandulous follicles, containing a musky substance. The utility of the Muskrat consists only in its skin, which is considered as good fur, and the down much

used in the manufacture of hats; but the odor of the musk renders its flesh unfit for food.

§ 140. The *Field-mouse* (*Arvicola Xanthognathus*) has a tail nearly as long as the body, round, and covered by a velvet-like tegument. It lives in meadows and grass-fields in abundance, and at the first hay-harvest their nests are found in great numbers on the surface of the ground. These are made very similar to a small bird's nest, and generally contain six or eight young ones.

§ 141. The *Marsh Campagnol* (*Arvicola Riparius*) may be observed, when the tide is high, sitting upon the fallen reeds, where it has the appearance of a lump of mud.

§ 142. The *Norway Rat* (*Mus decumanus*) is nine inches long, of a light brown color, intermingled with ash, with a round tail, bare, and covered with scales. This rat is a native of Norway, but was accidentally brought in the timber-ships to England, and then to America, where it is now found in great numbers. It brings forth from twelve to eighteen young at a litter, and is omnivorous. As the Norway rat is one of the most destructive animals, and of no use to man, it is necessary to destroy it as much as it is in our power, by means of cats, weasels, terriers, traps, and even of poison, but not arsenic, which is dangerous, and at the same time injurious to other animals.

§ 143. The *Black Rat* (*Mus Rattus*) is nearly of a black color on the upper, and of an ash color on the lower part of its body: it was formerly a native of Europe, but is now found in all parts of the globe, where it has been carried accidentally in vessels. The black rat is an omnivorous, destructive animal; eats seeds, flesh, carrion, and in time of famine, devours its own species; it is the greatest destroyer of sugar plantations, plunders the orange-trees, is seen in the holds of vessels, and in the deepest mines.

§ 144. The *Mouse* (*Mus musculus*) is smaller than a rat, has a long, scaly, bare tail, and the same constitution and natural disposition as the rat. The mouse brings forth five or six young at a litter, at all seasons, and several times in the year, which, in less than fifteen days, are strong enough to procure food for themselves.

§ 145. The *White Mice*, with red eyes, (Albinos,) are occasionally so sensible to the impression of light, as to close their eyelids in full day, so as to have the appearance of being blind.

§ 146. The *Rustic Mouse* (*Mus agrarius*) differs from the common mouse, having the spaces between the ears of an orange color, and the legs and feet of a pure white. It is found in great abundance in the fields.

§ 147. The *Squirrel* (*Sciurus*) is a gnawer, with a long and bushy tail, an effective instrument in promoting those long leaps which he makes from tree to tree. The squirrel takes his food from the vegetable kingdom, and is very injurious to corn-fields. There are about twelve different species of squirrels in the United States; among which are the Cat-squirrel, (*Sciurus cinereus*,) the Fox-squirrel of the South, (*Sciurus vulpinus*,) Common Gray-squirrel, (*Sciurus Carolinensis*,) Black-squirrel, (*Sciurus niger*,) Ground-squirrel, (*Sciurus striatus*,) and Flying-squirrel, (*Sciurus Volucella*.)

§ 148. The *Maryland Marmot*, Ground-hog, or Woodchuck, (*Arctomys Monax*,) is of the size of a rabbit, covered with long, rusty-brown hair, has short ears and cheek-pouches, and is an inhabitant of all temperate parts of the United States. The marmots dwell in subterraneous habitations, consisting of various chambers, where they lie in a torpid state during the greater part of the winter. They are very injurious to clover, which they collect, making great provisions for their subterranean abode; but their flesh can be eaten, and their skins used as fur. They are easily tamed, and learn several tricks.

§ 149. The *Canada Porcupine* (*Histrix dorsata*) is about the size of a fox, covered with short bristles or spines, two inches and a half long, which are concealed by long and coarse hair: it is a native of Canada. As those bristles are formidable arms for the animal, being too slow in its movements to escape by flight, it rolls itself up in a globular form, and is able to defend itself against an attack. The Indians make great use of the quills of the Porcupine as ornaments to their dresses, pipes, and weapons, and consider the flesh of it as a great luxury. The

Canada Porcupine is herbivorous, eats various wild fruit in the summer, and the bark and buds in the winter ; it does great mischief to the trunks of young trees.

¶ 150. The *Guinea-pig* (*Cavia Cobaya*) is as large as a rat, reddish gray above, white below, but varies in color when domesticated ; ears and tail very short, and a native of South America. The Guinea-pig is the most prolific of all the Mammalia, for it produces at each litter, every five weeks, from six to twelve young ; and a single pair increase in a short time to the number of 1,000. Their flesh is insipid, and their skins hardly of any use.

¶ 151. The *American Hare* (*Lepus Americanus*) is as large as a gray-squirrel, grayish brown, has very long ears, a short hairy tail, and is a native of North America. The American Hare, commonly, but improperly, called rabbit, is of no great use, for its flesh is insipid, and its fur of little value.

¶ 152. The *Common Hare* (*Lepus timidus*) is as large as a fox, grayish brown, has long pointed ears, and is a native of Europe. The fur of the *Common Hare* forms an important article in the hat manufacture, and its excellent flesh is often found in the market.

¶ 153. The *Rabbit* (*Lepus Cuniculus*) is as large as a gray-squirrel, of a gray color when wild, but various when domesticated. The white, with red eyes, are among the most common kind of Albinos. The Rabbit was originally a native of the warmer regions of the Old World, but is now found domesticated everywhere. Its flesh is insipid ; its skin of no value ; of its fur are made gloves, stockings, and hats. The Rabbit produces each month about six young ; and on account of its fecundity, it has become, in some places, a public calamity.

¶ 154. The *Jumping Hare* (*Dipus Jerboa*) is of the size of a rabbit, of a grayish-brown color, and is a native of the prairies of Southern Russia and Western Asia, where it lives in holes in the ground. The fore-legs of the Jumping Hare are very short, not used in walking, but his hind-legs are much elongated, by the aid of which, and by the use of its long tail, as a support, it executes a leap several

yards long. Their flesh is very good ; they eat only grain, never drink, and are very gentle animals. They are easily tamed, like the Marmot.

§ 155. The *Jumping Mouse* (*Gerbillus Canadensis*) is of the size of a common mouse, reddish brown ; has very short fore, but long hind legs ; a round, long, and scaly tail, like a rat. It is found in Canada, and as far south as Pennsylvania, in the grain and grass fields.

QUESTIONS ON SECT. VII.

136. What are Gnawers ?
137. By what is it shown that they are herbivorous ?
138. Describe the Beaver, and its use.
139. Describe the Muskrat.
140. Describe the Field-mouse.
141. Describe the Marsh Campagnol.
142. Describe the Norway Rat.
143. Describe the Black Rat.
144. Describe the Mouse.
145. What do you know of White Mico ?
146. Describe the Rustic Mouse.
147. Describe the Squirrel, and name the different species found in the United States.
148. Describe the Maryland Marmot.
149. Describe the Canada Porcupine, its peculiarities and use.
150. Describe the Guinea-pig.
151. Describe the American Hare.
152. Describe the Common Hare.
153. Describe the Rabbit.
154. Describe the Jumping Hare.
155. Describe the Jumping Mouse.



SECTION VIII.

5th Order—ONE-HOOFED MAMMALIA : (*Solidungula*.)

§ 156. *One-hoofed Mammalia* are those which have on each foot a hoof, six front teeth and twelve grinders in each jaw, no canine teeth, and which are herbivorous. The Horse, the Ass, and the Zebra, belong to this Order.

§ 157 The *Horse* (*Equus Caballus*) is a domestic ani-

mal, but in ancient times it was found wild in the deserts of Asia, Africa, and Europe. The large deserts of South America are at this time filled with wild horses, which are the descendants of those brought over by the Spaniards and set at liberty. Those wild horses are all brown, which indicates that the original stock was of a brown color. Every horse has thirty-eight or forty teeth, namely: twelve front teeth, twenty-four grinders; and the male two, and sometimes four, canine teeth.

§ 158. The front teeth indicate the age of the horse until it is eight years old. The twelve front teeth begin to appear fifteen days after birth, and are round, short, fall out at different times, and are to be replaced by others. The two middle front teeth above, and below, fall out when the animal is two years and a half old; the next four front teeth, above and below, fall out when the animal is three years and a half old: the remaining four of the extremities fall out at the age of four years and a half. The value of the horse is incalculable for agriculture, draught, and war. The hide is transformed into leather, and the milk and flesh are eaten by many Indians, Tartar tribes, Calmuks, and sometimes even by more civilized people; and their hair is used for the bottoms of chairs, sofas, and mattresses.

§ 159. The Ass (*Equus Asinus*) is distinguished from the horse by being smaller, having long ears, a short tail, and a different voice. The age of the Ass can be ascertained in the same manner as that of the horse. It is a native of Arabia, whence it was brought to Egypt; is now found in all temperate and warm climates, and is valued on account of its great utility in transporting travellers and merchandise over mountainous countries. It is also used like horses for draught, and is a very docile animal. The Hindoos treat the Ass with great consideration, believing that the souls of dead noblemen are destined to inhabit the bodies of Asses.

§ 160. The Zebra (*Equus Zebra*) is a native of Africa, has the form of the ass, and is of a white color, with black stripes. It lives in herds, is uncommonly swift, but wild and untractable.

QUESTIONS ON SECT. VIII.

- § 156. What are One-hoofed Mammalia?
 § 157. What do you know of the native country of the horse, and the number of its teeth?
 § 158. How can the age of the Horse be ascertained, and what use is made of this animal?
 § 159. Describe the Ass, its use, and the esteem for it among the Hindoos.
 § 160. Describe the Zebra.

SECTION IX.

6th Order—TWO-HOOFED MAMMALIA: (*Bisulia.*)

§ 161. *Two-hoofed Mammalia* are distinguished by having only eight front teeth in the inferior jaw; and nearly all, by also having six grinders on either side of each jaw. The Cloven-hoofed Mammalia are the most useful to man. Their *flesh*, *fat*, and *milk* are used as food; their *hides* for leather; their *horns* for knife-handles, combs, etc.; their *bones* for buttons or manure; and their *hair* for upholstering. Many of them are used for beasts of burden. They are divided into two families, viz.: those *without horns*, as the Camel, Llama, Vicugna, and Musk-goat; and those *with horns*, as the Elk, Reindeer, Stag, Giraffe, Antelope, Sheep, Goat, and Ox.

§ 162. The *Camel* (*Camelus bactrianus*) is much higher than a horse, covered with white and reddish-gray hair, has two humps on the back, and is found wild in large herds in the middle of Asia, and also as a domestic animal in Asia, Africa, and the east of Europe. It is employed as a beast of burden on account of its quick pace and natural saddle; one can carry a thousand pounds, and travel one hundred miles in a day. Camels were used at the time of Moses, by the Israelites, who called it Gamel. The Camel subsists on coarse kinds of vegetables, such as thistles and thorny shrubs, and can endure thirst for many days. It lives from forty to fifty years.

§ 163. The *Dromedary* (*Camelus dromedarius*) is higher than a horse, of a white and reddish-gray color, with one

hump on the back, and is found as a domestic animal in Africa and Asia, but occasionally wild in the deserts between China and Hindoostan. The Dromedary is called the Ship of the Desert, by the Arabs; can be loaded with about six hundred pounds, and travels about twenty miles a day.

§ 164. The *Llama* (*Camelus Llama*) is of the size of a small stag; its fur rough, brownish yellow, black above, white below, and lives in troops on the highest mountains of Peru. The domestic Llama is employed in South America as a beast of burden, and will carry one hundred and fifty pounds. Its flesh is used as food, and its hide as leather.

§ 165. The *Vicugna* (*Camelus Vicuna*) is of the size of a goat, covered with a very fine reddish-brown wool, and found in large herds on the mountains of Chili. The *Vicugna* cannot be tamed, but is taken every year in great numbers, for the sake of the well-known *Vicugna* wool, which is much used in manufactures.

§ 166. The *Musk-goat* (*Moschus moschifer*) is of the size of a goat, brown-colored, with a musk-bag near the navel, almost as large as a hen's egg: it is found in the forests and mountainous regions of Thibet and the south of Siberia. The use of the Musk-goat consists in its musk as medicine, its flesh as food, and its hide as leather.

§ 167. The *Pigmy Musk* (*Moschus pygmaeus*) is found in Guinea and the East Indies. It is the smallest animal of this Order, for its legs are only three inches long, and not thicker than a quill. The back part of the body is brown, and the under part white.

§ 168. The *Moose Deer* or *Elk* (*Cervus Alces*) is of the size of a horse, and weighs upwards of 1,200 pounds: it is brown-colored, has palmated horns, which weigh upwards of fifty pounds, and is a native of the northern parts of Europe, America, and Asia. The flesh of the Elk is delicious food, and the skin of great value for clothing.

§ 169. The *Reindeer* (*Cervus Tarandus*) is of the size of the common stag, of a brownish color, has branched horns in both sexes, and is found in all the northern parts of the world, sometimes in Kamtschatka, in herds of a thousand or more. It cannot exist in warm climates,

lives on dry leaves, and particularly on Reindeer moss, which it scrapes from under the snow. It has been domesticated for a long time in Europe and Asia, where it is used as a beast of burden. It is to the inhabitants of the North of the same use as the Camel to those of the South. It furnishes, besides milk, flesh and clothing.

§ 170. The *Common Deer* (*Cervus virginianus*) is of the size of an ass, has branched horns, and a brown color, and is found between Canada and South America. Everywhere great numbers are killed for the sake of their flesh and hides, which form a great article of commerce for the manufacture of gloves.

§ 171. The *Giraffe* (*Giraffa Camelopardalis*) is a cloven-hoofed animal, with two short straight horns, an unproportioned long neck, and a reddish spotted skin: it is a native of the interior of Africa. The Giraffe received the name *Camelopardalis* from the ancients, because its neck has a resemblance to that of the Camel, and its dress to that of the Leopard. In walking, the Giraffe moves the fore and the hind foot of the same side together, like an ambling horse; from which circumstance it has a very remarkable motion. The height of the Giraffe from the crown of the head to the soles of the fore-feet, is seventeen feet, and from the top of the rump to the soles of the hind-feet, only nine; the length of the body is seven feet. The Giraffe is not only a beautiful creature, but it is as gentle in its disposition as a sheep, and more amiable than any other wild beast. When standing, it cannot browse the grass without great difficulty; it feeds, therefore, principally upon the leaves of trees. When it wants to drink or to take any thing from the surface of the earth, it is obliged to bend down on its knees. The horns of the Giraffe are a foot in length, and as thick as a man's arm: its tail is slender in proportion to the length of the animal, and ornamented at its extremity with a tuft of black hair, which is from seven to eight inches long.

§ 172. *Antelopes*, which are also cloven-hoofed, resemble the deer in regard to their size, color, and agility. Their flesh may be considered as the best of venison.

and of their hide are made various articles of clothing. Their horns are without branches, and hollow.

§ 173. The *Gnou* (Antilope Gnou) is of the size of a horse, and a native of South Africa. This animal seems at the first view to be composed of parts of several animals, for its brown body and tail resemble those of a horse, its head and horns those of a buffalo, and its cloven-hoofed feet have the agility of a stag.

§ 174. The *Prong-horned Antelope* (*Antilope americana*) is of the size of a goat, and is found from Canada to the Rocky Mountains.

§ 175. The *Sheep* (*Capra Ovis*) has rough hollow horns, the internal part of which contains several cavities. It is no longer found wild. Of all animals, the Sheep is the most useful to man. From it we are supplied with both food and clothing. The rearing of sheep is therefore an important branch of rural economy; one that is very profitable to those landholders who are in possession of much uncultivated ground and woodland, and consequently well adapted to the farmers of the West, where pasturage is abundant. The ewe produces one or two lambs; and in warm climates, twice a year. She can be milked twice a day; and her milk mixed with that of the cow, makes very good cheese. The month of May is the best time for shearing sheep, for the wool is much cleaner at that time than in summer. One sheep produces about two pounds and a half of wool. The most remarkable races of sheep are the Spanish, English, and Saxon, for their fine wool; those of Ireland, with four, six, or eight horns; and those of Arabia, Egypt, and Transcaucasia, with fat and flat tails.

§ 176. The *Common Goat* (*Capra Hircus*) is principally distinguished from the sheep by a beard on the throat, and by its straight hair. The flesh of the Goat is inferior to that of the sheep; its hair is of no use, but its skin is manufactured into leather; and in some countries cheese is made of its milk.

§ 177. The *Angora Goat* has long silky hair; and from the extremely fine wool which the small, but hand-

some straight-horned goats of Thibet and Cashmere have under their long and coarse coats of hair, are manufactured the costly shawls of those lands.

§ 178. The *Rocky Mountain Goat* (*Capra montana*) is of the size of a sheep, and covered with long, soft, and white hair, which, it is said, is as fine as the fleece of the Angora Goat. It is an inhabitant of the Rocky Mountains.

§ 179. The *Ox* (*Bos Taurus*) has round horns, and a tail terminating in a brush. The Ox is more useful than the horse, for he not only works for us, but also furnishes food, leather, and manure. Oxen are more profitable for draught than horses, because their food and harness are cheaper; and should they be lamed or grow old, they can be fattened and delivered to the butcher. The thickness of his neck, and broadness of his shoulders, point him out as destined for the yoke; he is, therefore, harnessed with a collar and worked like a horse. Cows and Oxen are in their greatest vigor from three to nine years of age, when they may be fattened.

§ 180. The age of oxen or cows may easily be known by the number of rings on the horns. At the age of three years the horns are smooth and even: in the course of the fourth year a circle forms around the base of the horn, near the head. This is every year succeeded by another. If, therefore, the first circle is considered as three years, a cow or ox with five circles will be eight years old. The essential point of economy in the keeping of cows, is to make them give the greatest quantity of milk, which can be effected by housing and feeding them well during the six winter months, and by stall-feeding during the summer.

§ 181. The *Bison* or *American Buffalo* (*Bos americanus*) is distinguished by a beard beneath the lower jaw, a long mane, and a hump on the back; it is the largest land-animal of the New World. The flesh of the Bi-on is good food, his hide produces excellent leather, and the wool may be used in the hat manufacture.

§ 182. The *Musk Ox* (*Bos moschatus*) is much smaller than the common ox, and covered with long blackish-brown hair. It is found in the greatest numbers within the Arc-

tic Circle. The flesh of the Musk Ox, although highly scented with musk, is considered good food, and his hide is suitable for making soles for shoes. The favorite food of the Musk Ox is grass, moss, and the twigs of willows: it weighs about 700 pounds.

QUESTIONS ON SECT. IX.

161. What are Two-hoofed Mammalia, and what use is made of them?
162. Describe the Camel, its use and peculiarities.
163. Describe the Dromedary.
164. Describe the Llama.
165. Describe the Vicugna.
166. Describe the Musk Goat.
167. Describe the Pigmy Musk.
168. Describe the Elk.
169. Describe the Reindeer.
170. Describe the Common Deer.
171. Describe the Giraffe, with its peculiarities.
172. Describe the Antelopes, and their use.
173. Describe the Gnou.
174. Describe the Prong-horned Antelope.
175. Describe the Sheep, with regard to its great utility, and its races.
176. Describe the Goat, and its utility.
177. Describe the Angora Goat.
178. Describe the Rocky Mountain Goat.
179. Describe the Ox, and its great utility.
180. How can the age of an Ox or a Cow be ascertained?
181. Describe the Bison.
182. Describe the Musk Ox.

SECTION X.

7th Order—MANY-HOOFED MAMMALIA: (*Multungula*.)

§ 183. The *Multungula* contain all those Mammalia which have more than two hoofs on each foot; as the Hog, Tapir, River-horse, Elephant, and Rhinoceros.

§ 184. The *Hog* (*Sus Scrofa*) has four hoofs, six front teeth in each jaw, with tusks and grinders, and is found in all countries.

§ 185. The *Wild Boar* differs from the domestic hog

in being of a dark color, and in having a larger muzzle and head, and shorter ears. He has four tusks, or very long canine teeth in either jaw: with these, which are sharp, and sometimes nine or ten inches long, he defends himself, and wounds or kills those who attack him.

§ 186. That the Wild Boar is the original stock of our domestic hog, is evident from the fact that all domestic hogs become wild by being put at liberty, and that all wild boars when tamed become domestic.

§ 187. The *Domestic Hog* is an omnivorous animal; he feeds on vegetables, putrid flesh, and carrion: all his appetites are impure, and he devours indiscriminately every thing that comes in his way, even his own progeny, and sometimes infants.

§ 188. Hogs furnish pork, which is an important article of food in most countries. Its bristles are extensively used in the manufacture of brushes, etc.

§ 189. The Wild Boar, which always lives in the forest, feeds mostly on vegetables, such as acorns, chestnuts, and all kinds of grain. His flesh is therefore much better and more wholesome than that of the domestic hog.

§ 190. The Hog has been converted into a beast of draught in the island of Minorca, where several of them are yoked together for ploughing; usually, however, with an ass helpmate ahead.

§ 191. The Mohammedans are deprived of this useful animal, because it is their religious belief that it is unclean and therefore they dare not either touch or feed it. The Chinese, on the contrary, rear hogs in large numbers, and pork is their most common food.

§ 192. The use of pork is injurious to persons afflicted with cutaneous eruptions, particularly in warm climates; hence it was denied to the Israelites to raise hogs or eat pork, and Mohammed adopted the same law in his Koran.

§ 193. The hog will live twenty years, and produces, twice a year, a dozen or more young at a litter.

§ 194. The *Peccary* (*Sus Tajassu*) resembles the common hog in size; it is dark ash-colored, with a white ring around the neck, and a gland upon the back, between the shoulders, which contains an oily, musk-like substance.

He is a native of the warmer countries of North and South America.

§195. The *Tapir* (*Tapirus americanus*) is of the size of an ass; of a brown color; is covered with but little hair; has a prolonged snout; four hoofs on the fore and three on the hind feet. He inhabits the woods and rivers of the eastern shores of South America.

§196. He is a timid and harmless animal; sleeps during the day, and seeks his food in the night. He eats grass, sugar-cane, and fruit. His flesh is eaten.

§197. The *River-horse* (*Hippopotamus amphibius*) has four hoofs, and four tusks in a vastly wide mouth; a body of a whitish color, with very thin hair; a bare, compressed, tapering tail, about one foot long, and is found in the rivers of Africa, from Senegal to Ethiopia, and at the Cape of Good Hope.

§198. The *River-horse* is about seven feet high, and seventeen long; his head is of an enormous size, being three feet and a half long; his mouth wide; and his canine teeth are so hard and strong that they strike fire with steel; which gave rise to the fable of the ancients, that the *River-horse* vomited fire from his mouth. When full grown he weighs 3,500 lbs. The ancients gave him the name of *River-horse*, on account of the similarity of his voice to that of a horse.

§199. The *River-horse* is naturally mild; besides, he is so heavy and slow in his movements that he cannot overtake an animal. He feeds on rice, grass, sugar-cane, and other vegetables, as well as on fish.

§200. The flesh of the *River-horse* is very good, and his fat, of which 2,000 pounds were found in a single one, is considered excellent; it is salted and sent to the Cape, where it sells very dear; in Africa it is recommended as a sovereign remedy for diseases of the breast.

§201. The *Asiatic Elephant* (*Elephas asiaticus*) is, when full grown, fifteen feet high; weighs 7,000 pounds; has five hoofs on each foot; two tusks eight feet long on the upper jaw, each weighing two hundred pounds; a long prehensile snout; a body of a gray color thinly

covered with hair, and a short tail. He is found in troops in Hindoostan, and is frequently domesticated.

§ 202. The *African Elephant* (*Elphas africanus*) is a native of the middle and south of Africa, but as a domestic animal only in the interior of that continent. He is eight feet high, and is hunted and killed merely for his flesh and ivory.

§ 203. The food of Elephants consists principally of the leaves of trees, rice, and other grains.

§ 204. An Elephant in the Botanic Garden at Paris has daily 80 lbs. of bread, 8 quarts of wine, and 2 pails of boiled rice.

§ 205. The Elephant was regarded by the ancients as a miracle of nature; they ascribed to him intellectual powers, moral virtues, rational manners, and even ideas of religion.

§ 206. The Hindoos are still persuaded that a body so majestic as that of the Elephant must be animated with the soul of a great man, or a king.

§ 207. Elephants are neither sanguinary nor ferocious, their manners are social, and their dispositions gentle; but it is dangerous to do them the smallest injury, for they run straight upon the offender, overtake the most agile man, and trample him under their feet.

§ 208. It was formerly believed that the young sucks with its trunk, but it is now ascertained that it sucks with its mouth, like other Mammalia.

§ 209. The first European who mounted an Elephant, was Alexander the Great, king of Macedon. Hannibal transported Elephants from Africa, and made them pass the Alps, where a number of them perished, the bones of which are still found.

§ 210. A disease called Elephantiasis, to which Elephants are often subject, is a dry leprosy, which sometimes causes the scarf skin to grow three or four lines thick.

§ 211. The *Asiatic Rhinoceros* (*Rhinocerus asiaticus*) is twelve feet long and six feet high, of a dark-gray color, has three hoofs on each foot, one horn upon his nose

about three feet long, and a skin which is rolled up into large folds at the neck and shoulders.

§ 212. The *African Rhinoceros* (*Rhinoceros africanus*) is distinguished from the Asiatic, by having two horns on the nose; and his skin, though very rough and hard, is not rolled up in folds.

§ 213. The horn upon the nose of the *Rhinoceros* serves as a weapon of defence against the assaults of lions and tigers; and his thick impenetrable skin is invulnerable to the attacks of the most ferocious animals.

§ 214. The *Rhinoceros* feeds on rice, the sugar-cane, leaves, and on thistles and thorny shrubs. He has a peaceful disposition, and never attacks men or other animals, unless provoked; but he is a stupid and untractable animal.

§ 215. The flesh of the *Rhinoceros* is reckoned excellent by the Indians and Negroes; his skin makes the hardest and best leather in the world; the horn is more esteemed than the ivory of the Elephant; and all the other parts of his body, even his blood, are deemed to be antidotes against poison, and some other diseases.

QUESTIONS ON SECT. X.

- § 183. What are Many-hoofed Mammalia? Name some of them.
- § 184. Describe the Hog.
- § 185. Describe the Wild Boar.
- § 186. How can it be shown that it is the original stock of the domestic hog?
- § 187. What is the peculiarity of the domestic hog, with respect to its appetite?
- § 188. What use is made of it?
- § 189. On what does the Wild Boar feed?
- § 190. What use is made of the hog in Minorca?
- § 191. What use do the Mohammedans and Chinese make of it?
- § 192. In what countries, and to whom, is the use of pork injurious?
- § 193. How long will a hog live, and how many young does it produce?
- § 194. Describe the Peccary.
- § 195. Describe the Tapir.
- § 196. What is the disposition, food, and use of the Tapir?
- § 197. Describe the River-horse.
- § 198. What is his size and weight, and what said the ancients about him?
- § 199. What is his peculiarity?
- § 200. What use is made of him?
- § 201. Describe the Asiatic Elephant.

- § 202. Describe the African Elephant.
 § 203. On what do they feed?
 § 204. What food is daily given to an elephant in the Botanic Garden at Paris?
 § 205. What idea had the ancients of the elephant?
 § 206. What do the Hindoos think about him?
 § 207. What is his disposition?
 § 208. How does the young elephant suck?
 § 209. Who was the first European to mount an elephant, and who transported many of them to Europe?
 § 210. What disease is called Elephantiasis?
 § 211. Describe the Asiatic Rhinoceros.
 § 212. Describe the African Rhinoceros.
 § 213. Of what use is his horn?
 § 214. What disposition has he, and on what does he feed?
 § 215. What use is made of him?

SECTION XI.

8th Order—TOOTHLESS MAMMALIA: (*Edendata.*)

§ 216. *Toothless Mammalia* are those which have no front teeth, and many of them no teeth at all; as the Sloth, Ant-eater, Scaly Lizard, Armadillo, and Duck-bill.

§ 217. The *Three-toed Sloth* (*Bradypus tridactylus*) is of the size of a fox, with long and rough hair of a dirty yellow color, has three long sharp claws on each foot, and is without a tail. It is a native of South America, where it dwells on trees and feeds on leaves.

§ 218. Sloths cannot walk fast, for their thighs are ill-jointed to the haunches, and their legs short and ill-turned.

§ 219. They are very stupid, and seem destitute of feeling, for striking them makes no impression. Besides, they are so tenacious of life, that they continue to live a considerable time after the heart is separated from the body.

§ 220. Sloths, singular on account of the great number of their ribs, are not less singular in regard to their stomachs, which, like those of the cloven-hoofed order, are divided into four cells, for ruminating.

§ 221. They produce only one young at a time, which they always carry on their back. The flesh of these animals is eaten by the natives,

§ 222. The *Two-toed Sloth* (*Bradypus didactylus*) is distinguished from the *Three-toed Sloth*, by having only two claws on its feet, and not being so slow.

§ 223. The *Great Ant-eater* (*Myrmecophaga jubata*) is as large as a bulldog, and toothless. His body is covered with long, coarse, black hair, mixed with gray. He has a long slender nose, small black eyes, short round ears, a narrow mouth, a slender tongue two feet and a half long, which lies double in his mouth, with four very large, strong, and hooked claws on the fore-feet, and five on the hind-feet. The tail, two and a half feet long, is clothed with very coarse black hair, a foot long. The length of the body from nose to tail is about four feet. The Ant-eater is a native of South America, and feeds exclusively on ants, which he procures by digging the ant-hills with his sharp claws, and seizing them with his long and slippery tongue. But when domesticated, he is fed with bread, or meal tempered with water, and even meat.

§ 224. He does not move and walk so fast as a man; and when pushed forward, he rises and sits on his hind-feet like a dog, in order to defend himself with his sharp claws, with which he is able to tear in pieces even the Jaguar.

§ 225. This animal is not able to do any harm to man, on account of its slowness, and it is easily killed by striking it on the head with a cane. The flesh of the Ant-eater, which is black and without fat, is eaten by some people.

§ 226. The *Two-toed Ant-eater* (*Myrmecophaga didactyla*) is not larger than a rat; is covered with short, fine, and woolly pale-yellow hair; has two claws on the fore and four on the hind feet; a prehensile tail, like a monkey; and is found in South America, upon trees, where he feeds on those ants which build their hills around the branches.

§ 227. The *Duck-bill* (*Ornithorhynchus paradoxus*) is of the size of a large cat, of a pale-yellow color, and principally distinguished by its flat bill with two grinders, entirely like that of a duck, as well as by its feet, which are

provided with webs. It lives near the lakes about Botany Bay, New Holland.

¶ 228. The Duck-bill lives continually in the water, dives very well, feeds probably on worms, and defends itself by wounding and poisoning with the spurs found on its hind-feet; thus producing considerable inflammation, even in man.

¶ 229. The *Scaly Lizard* (*Manis tetra-dactyla*) is about three feet long, of a brown color, entirely toothless, and covered with hard, moveable scales, which can be elevated and depressed at pleasure, like the bristles of the porcupine.

¶ 230. The *Scaly Lizard* is an inhabitant of East India: it defends itself by erecting its large, hard, and poignant scales, and rolling itself up like a ball, in which position the tiger and panther endeavor in vain to devour it.

¶ 231. The *Scaly Lizard* feeds altogether on ants. Its flesh is eaten by some inhabitants of India.

¶ 232. The *Armadillo* (*Dasypus novemcinctus*) is of the size of a cat, toothless, and covered with yellow, solid, long crusts, which are united on the back by several moveable long bands, by means of which it is able to roll itself up into a ball, when attacked.

¶ 233. The *Armadillo* is found in all parts of South America, where it lives in holes, under ground, and feeds principally on ants. The flesh of this animal is very delicate.

¶ 234. *Ant-eaters*, *Scaly Lizards*, and *Armadilloes* are a great blessing to tropical countries, where they devour myriads of different kinds of ants, termites, and wood-lice, which reduce, in a short time, to mere dust, not only the trees of large forests, but whole dwelling-houses, with all their furniture.

QUESTIONS ON SECT. XI.

- 216. What are the toothless Mammalia?
- 217. Describe the Three-toed Sloth.
- 218. Why can Sloths not walk fast?
- 219. What are their peculiarities?
- 220. On what account are they singular?
- 221. How many young do they produce at a time?
- 222. Describe the Two-toed Sloth.

223. Describe the Great Ant-eater.
 224. How does he walk and defend himself?
 225. Why can he not do any harm to man?
 226. Describe the Two-toed Ant-eater.
 227. Describe the Duck-bill.
 228. What do you know of its abode, food, and weapon?
 229. Describe the Scaly Lizard.
 230. Where is it found, and how does it defend itself?
 231. Of what does its food consist, and what is its use?
 232. Describe the Armadillo.
 233. What is its native country and its use?
 234. Why are Ant-eaters, Scaly Lizards, and Armadilloes a great blessing to tropical countries?

SECTION XII.

9th Order—FISH-LIKE MAMMALIA : (*Cetacea*.)

§ 235. *Fish-like Mammalia* are those which live in the water; and which, instead of hind feet, have a horizontal caudal fin, and fore-feet degenerated into fin-like limbs. But though the Fish-like Mammalia perfectly resemble fishes, they are distinguished from these by their internal construction, as they breathe with lungs, and not with gills; and they are warm-blooded and viviparous. To this Order belong the Narwhal, the Whale, the Cachelot, and the Dolphin.

§ 236. The *Narwhal* (*Monodon Monocerus*) is about sixteen feet long, exclusive of the tusk, which, projecting from the upper jaw, is spiral and hollow, and ten feet long. Its general color is blackish-gray, variegated with numerous dark spots on the back and sides, and white on the belly. The Narwhal is an inhabitant of the Arctic Seas, where numerous herds are seen together, and feeds on shellfish and other fishes; it is hunted for its blubber, which is from two to three inches thick, and lies immediately beneath the skin. The flesh is eaten by the Greenlanders and Esquimaux; the oil is burned in their lamps, the intestines are wrought into lines, and the tusks used for spears.

§ 237. The *Black Whale*, (*Balæna Mysticetus*), the largest animal on our globe, is from sixty to seventy feet long, about thirty feet high, weighs 100,000 pounds, is of a velvet-black color on the back, and partly white below. It is found in the frozen seas of Greenland and Davis' Strait; in the bays of Baffin and Hudson; in the sea to the northward of Behring's Strait, and along some parts of the northern shores of Asia and America.

§ 238. No warm-blooded animal would be able to endure the extreme cold of those northern regions, if Providence had not provided their internal organization with a high degree of heat. The temperature of the blood of a Black Whale one hour after death was found to be 97° Fahr.

§ 239. The *mouth* of the Black Whale, when open, forms a cavity about eight feet wide, twelve feet high, and sixteen feet long.

§ 240. The *two fins*, placed about two feet behind the angle of the mouth, are from seven to nine feet in length, and four or five in breadth.

§ 241. The *tail* has a length of only five or six feet, but its width is from twenty to twenty-six feet, and its surface about a hundred square feet: its position is horizontal.

§ 242. The *eyes*, which are on the side of the head, are remarkably small, in proportion to the size of the animal's body, being not much larger than those of an ox. The *two blow-holes*, called spiracles, consisting of two longitudinal apertures, are the proper nostrils, and are situated on the most elevated part of the head: through these the water is spouted as from a fountain.

§ 243. The *whalebones* are contained in the mouth, in place of teeth, and suspended in two extensive rows from the sides of the crown-bone, which gives an arched form to the roof of the mouth. Each series consists of upwards of 300 laminæ. Fifteen feet is the greatest length of the whalebone, and its greatest breadth about one foot. A large Whale sometimes affords 1,500 pounds of whalebone, of which the largest weighs seven pounds.

§ 244. The *blubber*, or fat, which encompasses the whole body of the Whale, lies beneath the skin, is yellowish-

white, yellow, or red, and about twenty inches thick ; and the quantity of oil produced from the blubber of a middle-sized Whale sometimes amounts to 20,000 pounds. The value of the oil and whalebone of a large Whale may be from 3,000 to 4,000 dollars.

§ 245. The *milk* of a Whale resembles that of quadrupeds in its appearance, and is rich and well-flavored. The *flesh* of the old Whale is black, and exceedingly coarse ; but that of the young, which is of a red color, when cleared of fat, and prepared, is like coarse beef. The *brain* in a young Whale of 11,200 pounds, weighed three pounds twelve ounces ; while that of a human being of 140 pounds weight, is about four pounds. The *food* of the Black Whale consists of the smaller animals of the fish kind, though its mouth is sufficiently capacious to receive several tons of water at a mouthful. The Whale produces only one young at a time, which is about fourteen feet in length.

§ 246. The *Cachelot*, or *Spermaceti Whale*, (*Physeter macrocephalus*.) is of the size of the Black Whale, with an enormous head, almost half as long as its body ; the upper jaw without teeth, but the lower armed with more than forty thick, conical teeth, about six inches long and three in circumference at the base. The Spermaceti Whale, which is found in the South Seas, on the coast of Brazil, and in the Pacific, is taken principally for the sake of the spermaceti, which is found in the form of milk-white oil, partly in the body, near the blubber, and in greater quantity in particular cavities in the head ; which oil, exposed to the air, hardens into a semi-transparent kind of tallow, called spermaceti.

§ 247. The Sperm Whale fishery is a principal branch of the industry of the United States. The number of ships engaged in this valuable branch of the fisheries may at this time amount to more than three hundred.

§ 248. The *Porpoise* (*Delphinus Phocæna*) is from six to eight feet long, of a blackish-blue color, has a short, not pointed mouth, with conical teeth in both jaws, and is found in the Atlantic. The Porpoise is seen in large troops, and feeds principally on fish.

§ 249. The *Dolphin* (*Delphinus Delphis*) differs from the Porpoise in being smaller, and having a long, pointed snout, and a body of a blackish-green color. This is the true Dolphin of the ancients.

QUESTIONS ON SECT. XII.

235. Describe the Fish-like Mammalia.
236. Describe the Narwhal.
237. Describe the Black Whale.
238. What is the cause that some warm-blooded animals can endure the greatest cold of the northern regions?
239. Describe the mouth of the Black Whale.
240. Describe the two fins.
241. Describe the tail.
242. Describe the eyes and spiracles.
243. Describe the whalebones.
244. Describe the blubber.
245. What do you know of the milk, flesh, brain, and food of the Black Whale?
246. Describe the Spermaceti Whale, and the use which is made of it.
247. What can you say of the Sperm Whale fishery of the United States?
248. Describe the Porpoise.
249. Describe the Dolphin.

LIST OF MAMMALIA FOUND IN THE STATE OF NEW YORK, AND DESCRIBED BY DOCTOR JAMES E. DE KAY IN HIS ZOOLOGY OF NEW YORK.

3d Order : CARNIVOROUS MAMMALIA.

- | | |
|--------------------------|------------------------------|
| 1. The New York Bat. | 14. The American Black Bear. |
| 2. " Hoary Bat. | 15. " Raccoon. |
| 3. " Little Crown Bat. | 16. " Wolverine. |
| 4. " Silver-haired Bat. | 17. " Skunk. |
| 5. " Caroline Bat. | 18. " Fisher. |
| 6. " Common Starnose. | 19. " American Sable. |
| 7. " Common Shrew-Mole. | 20. " Small Weasel. |
| 8. " De Kay's Shrew. | 21. " Brown Weasel. |
| 9. " Short-tailed Shrew. | 22. " New York Ermine. |
| 10. " Small Shrew. | 23. " Mink. |
| 11. " Forster's Shrew. | 24. " North American Otter. |
| 12. " Carolina Shrew. | 25. " Domestic Dog. |
| 13. " Broad-nosed Shrew. | 26. " Common American Wolf. |

- | | |
|-------------------------|-------------------------|
| 27. The Red Fox. | 32. The Wild Cat. |
| 28. " Gray Fox. | 33. " American Seal. |
| 29. " Domestic Cat. | 34. " Hooded Seal. |
| 30. " Northern Panther. | 35. " American Opossum. |
| 31. " Northern Lynx. | |

4th Order : GNAWERS.

- | | |
|---------------------------------------|------------------------------------|
| 36. The Little Gray-squirrel. | 48. The Black Rat. |
| 37. " Fox-squirrel. | 49. " American Black Rat. |
| 38. " Black-squirrel. | 50. " Common Mouse. |
| 39. " Red-squirrel. | 51. " Marsh Meadow-mouse. |
| 40. " Striped-squirrel. | 52. " Tawny Meadow-mouse. |
| 41. " Small American Flying-squirrel. | 53. " Beaver Field-mouse. |
| 42. " Woodchuck or Marmot. | 54. " Oneida Meadow-mouse. |
| 43. " Dore-mouse. | 55. " Light-col'd Meadow-mouse. |
| 44. " Beaver. | 56. " Yellow-cheeked Meadow-mouse. |
| 45. " Musquash or Muskrat. | 57. " American Gray Rabbit. |
| 46. " N. American Porcupine. | 58. " Northern Hare. |
| 47. " Brown Rat. | |

5th Order : ONE-HOOFED MAMMALIA.

- | | |
|----------------|--------------|
| 59. The Horse. | 60. The Ass. |
|----------------|--------------|

6th Order : TWO-HOOFED MAMMALIA.

- | | |
|-----------------------|----------------------|
| 61. The Ox. | 64. The Moose. |
| 62. " Domestic Sheep. | 65. " American Stag. |
| 63. " American Deer. | 66. " Reindeer. |

7th Order : MANY-HOOFED MAMMALIA.

67. The Common Hog.

9th Order : FISH-LIKE MAMMALIA.

- | | |
|-------------------------|------------------------|
| 68. The Right Whale. | 72. The Social Whale. |
| 69. " Sperm Whale. | 73. " Common Porpoise. |
| 70. " Beaked Rorqual. | 74. " Grampus. |
| 71. " Northern Rorqual. | 75. " Sea Porpoise. |

SOURCES OF REFERENCE FOR THE NATURAL HISTORY OF
MAMMALIA.

Th. Pennant's British Zoology.....	1777
Dictionnaire d'Histoire Naturelle	1804
Cuvier, Regne Animal.....	1807
Long and Clark's Expedition to the Rocky Mountains	1817
Annals of the Lyceum of Natural History in New York	1824
Blumenbach's Handbuch der Naturgeschichte.....	1825
Godman's American Natural History.....	1826
L. Oken's Naturgeschichte für alle Stände.....	1836
James E. De Kay's Zoology of New York.....	1840

SECTION XIII.

II. ORNITHOLOGY.

§ 250. Birds are warm-blooded, oviparous animals, provided with two wings and two feet, a horny, toothless bill, and a body covered with feathers.

§ 251. The flying of birds is facilitated by making themselves specifically lighter: an effect produced by inflating with air, through the lungs, certain delicate membranous cells, situated under the shoulders and below the hind-part of the body; as well as by filling with air the hollow bones of the shoulders.

§ 252. The formation of the bird's embryo in the egg is effected by natural or artificial heat of about 96° Fahrenheit, during a longer or shorter time, either by placing the egg under the parent bird, or by putting it in a breeding-machine.

§ 253. The remarkable metamorphosis of an inanimate egg, as of a hen, for instance, to an animate being, takes place within the space of twenty days. At the end of the second day the first moving of the heart is perceptible, and on the fifth the whole frame of the little creature can be distinctly seen in motion. The feathers make their appearance in a fortnight. At the commencement of the fifteenth day the chicken begins to breathe, and on the nineteenth it is able to peep.

§ 254. The use of birds to man is very considerable. Birds of prey devour dead carcasses, mice, and rats; Warblers feed on insects, which, from their numbers, would otherwise destroy our fields, gardens, and fruit; the gallinaceous or hen-like birds regale us with their flesh and eggs; and the water-birds furnish us with eggs, flesh, feathers, and down.

§ 255. Birds are also, on account of their beautiful plumage, graceful motions, skill, attention, memory, docility, and attachment to man, the greatest ornament of the animal kingdom.

§ 256. Birds may be divided into six Orders, viz :

1st Order—	Birds of prey :	(Accipitres.)
2d “	Warblers :	(Passeres.)
3d “	Climbers :	(Scansores.)
4th “	Hen-like Birds :	(Gallinæ.)
5th “	Long-legged Birds :	(Grallæ.)
6th “	Swimming Birds :	(Anseres.)

1st Order.—BIRDS OF PREY.

Fig. 15.



THE TURKEY-BUZZARD.—(*Vultur Aura*.)

2d Order.—WARBLERS.

Fig. 16.



THE MOCKING-BIRD.—(*Turdus polyglottus*.)

3d Order.—CLIMBERS.

Fig. 17.

THE CAROLINA PARROT.—(*Psittacus Carolinensis*.)

4th Order.—HEN-LIKE BIRDS.

Fig. 18.

THE CALIFORNIA QUAIL.—(*Perdix Californicus*.)

5th Order.—LONG-LEGGED BIRDS.

Fig. 19.

THE AFRICAN OSTRICH.—(*Struthio Camelus*.)

6th Order.—SWIMMING BIRDS.

Fig. 20.

THE CANVASS-BACK.—(*Onas Vallisneria*.)

QUESTIONS ON SECT. XIII.

- § 250. What are birds?
 § 251. By what is the flying of birds facilitated?
 § 252. How is the formation of the bird's embryo effected?
 § 253. In what time does the metamorphosis of an inanimate egg to an animate being take place?
 § 254. What is the use of birds to man?
 § 255. Why are birds the greatest ornament in the Animal Kingdom?
 § 256. Into what Orders are birds divided?

SECTION XIV.

1st Order—BIRDS OF PREY: (*Accipitres*.)

§ 257. *Birds of prey* are those which have a hooked bill, turned inward; short, strong feet, with four toes, terminated with strong, crooked, sharp-pointed claws. They feed on flesh, make war upon other birds, and smaller animals, which they kill and devour. The Vulture, Hawk, and Owl are examples of this Order.

§ 258. They generally swallow their prey with the bones and feathers, which they do not however digest, but disgorge again in round balls.

§ 259. They are found in all parts of the world, but are most numerous in temperate climates: some species, on account of their facility in flying, are natives of all parts of the world.

§ 260. It is a remarkable fact, that the females of the birds of prey are one-third larger than the males, though in all the other Orders the males are always the largest. Another singular circumstance is, that they change their color, after the first and second moulting; insomuch that different names have sometimes been given to the same species.

§ 261. The *Condor* (*Vultur gryphus*) is, like all the Vultures, distinguished from the other birds of prey by having a head bare of feathers, and a thick collar of feathers about the shoulders, in which he can completely conceal his naked neck.

§ 262. The Condor is the largest of the flying birds. His expanded wings measure thirteen feet, and he is from three to four feet long, of a blackish-brown color, with a white circle around the neck, and is found in the regions of the Andes, in Peru, below the eternal snow, at the height of 8,000 feet. He feeds on all kinds of dead and live animals.

§ 263. The Condor excites surprise by his courage, as well as by the enormous strength of his beak, wings, and claws. He attacks not only the Llama, Vicugna, Stags,

and sheep, but also horned-cattle, and even the Cougar, which he pursues and tortures until the animal falls exhausted to the ground.

§ 264. The Condor, when domesticated, surpasses all other birds in courage, docility, quick perception, good-humor, and attachment to his keeper, with whom he plays like a young dog.

§ 265. The *Turkey-buzzard* (*Vultur Aura*) is two feet long, of a black color, and an inhabitant of the warmer countries of North America.

§ 266. The female of this bird forms a nest in a hollow tree, where she lays, on the rotten wood, from two to four eggs, of a white color, with blackish spots.

§ 267. Turkey-buzzards feed only on carrion, and their sense of smelling is so exquisite, that they can perceive it at the distance of several miles. They eat so immoderately that frequently they are incapable of rising, and may be caught in this condition without difficulty.

§ 268. The Turkey-buzzard is cherished on account of its usefulness in devouring putrid bodies; and in many countries they are protected by laws imposing a fine on persons who deprive them of life.

§ 269. As the skin of all the Buzzards is covered with a very fine down, the rich among the Tartars, Turks, and Persians use silk gowns lined with it. The skin is prepared principally in Cairo, by tanning it with the down on, after removing the feathers. The skin of our Turkey-buzzards could be prepared in the same manner.

§ 270. Birds of prey whose bills begin to be crooked at their origin, are called *Hawks*; and those whose bills are crooked only at the point, are called *Eagles*.

§ 271. *Hawks* were formerly much used for hunting. Falconry, for so this species of hunting was called, was a favorite amusement of sovereigns and the nobility, and even of ladies. A person of rank scarce stirred out without his hawk on his hand, which was the criterion of nobility.

§ 272. The ancients had a great idea of the *Eagle*. They represented him as the armor-bearer of Jupiter, holding the lightning in his talons; and to have a hooked

nose, like the bill of the Eagle, was considered an indication of courage. The Eagle was also called the king of birds, on account of the tyranny with which he treats them.

§ 273. The image of the Eagle is still seen upon the sceptres of kings. It surmounted the standards of the Roman, and in modern times those of the French armies.

§ 274. An Eagle was the principal figure in the arms of the Roman Emperors; and when the Roman empire was divided into that of the East, and that of the West, the Eagle was represented with two heads, a figure still seen in the arms of the Emperor of Austria.

§ 275. The *Owl* (*Strix*) is a bird of prey, distinguished by having a large round head, very large eyes, and feet covered with feathers.

§ 276. Owls live in forests, ruins, and steeples; feed on rats, mice, and small quadrupeds; and are active only at night, when, by their lugubrious sounds, they terrify the ignorant and superstitious.

§ 277. The fact that owls, when seen flying in the daytime, are always followed by a number of small birds, suggested the idea of catching birds by their assistance. This is practised principally in Italy.

§ 278. For catching small birds by the assistance of the Owl, it is necessary to tie a tamed owl upon a one-legged stool, in such a manner that it can fly up to the distance of four feet. This stool is fastened in the ground near a wood, or in a garden; around it, at a certain distance, are placed a number of thin sticks, covered with birdlime. As soon as the owl is seen, the birds approach and seat themselves upon the sticks: in this manner several hundreds are sometimes caught in a single day.

QUESTIONS ON SECT. XIV.

§ 257. What are birds of prey?

§ 258. How do birds of prey feed?

§ 259. Where are birds of prey found?

§ 260. What is singular in birds of prey in regard to their size and color?

§ 261. How is the Condor distinguished?

§ 262. What is the external character of the Condor? Describe it.

§ 263. Why does the Condor excite surprise?

§ 264. In what respect does the Condor surpass all other birds?

- § 265. What is the size, color, and native country of the Turkey-buzzard?
- § 266. How many eggs does the Turkey-buzzard lay? What is their color, and where does she lay them?
- § 267. On what does the Turkey-buzzard feed?
- § 268. Why is the Turkey-buzzard protected?
- § 269. What use is made of the skin of Buzzards?
- § 270. What birds are called Hawks, and what Eagles?
- § 271. What use was formerly made of Hawks?
- § 272. What idea had the ancients of the Eagle?
- § 273. Where is the image of the Eagle still seen?
- § 274. What do you know of the Eagle on the arms of the Roman Emperors?
- § 275. By what is the Owl distinguished?
- § 276. Where do Owls live, on what do they feed, and whom do they frighten?
- § 277. What suggested the idea of catching birds by the assistance of the Owl?
- § 278. How are birds caught by means of Owls?



SECTION XV.

2d Order—WARBLERS: (*Passeres.*)

§ 279. *Warblers* are small birds with straight bills and slender feet, which are not webbed.

§ 280. Many Warblers are accused of destroying cherries, corn, wheat, and rice; but the good which they do, far outweighs the injury. This is evident, if we consider that a single pair of Warblers with their young, consume in one day about fifty grub-worms, caterpillars, or other insects, during the months of March, April, May, and June.

§ 281. If we consider also, that at least fifty millions of Warblers dwell during the summer in the United States, we can readily calculate how many thousand millions of insects are devoured by them; which, if they were left alone, would entirely destroy our orchards, gardens, fields, and forests, and produce, perhaps, famine and pestilence.

§ 282. Hence to shoot, or otherwise destroy birds, for mere sport, in the spring and summer, when they are laboring for our benefit and rearing their young, is doing an injury, not only to the farmer, but to the whole community.

§ 283. The flesh of Warblers, which is excellent and wholesome food, can be used in the fall, and will pay for the little injury which those birds have done to our fruit and grains.

§ 284. These birds can be caught in trap-cages, with sticks besmeared with birdlime, and the assistance of a tame Owl; but the largest numbers are caught with nets prepared expressly for the purpose.

§ 285. As Warblers enliven the country by their variegated appearance and pleasant melodies, many persons keep a number of them in cages, to prolong through the winter the songs of summer.

§ 286. As birds are attentive, and have a good memory, they imitate musical sounds which they have repeatedly heard; Warblers kept in cages will, therefore, produce more harmonious notes, than those living in the woods. Among the Warblers, the following are distinguished by their handsome plumage or melodious song.

§ 287. The *Red-bird* (*Tunagra rubra*) is of the size of a Mocking-bird, has a scarlet body, with red wings, and is a bird of passage. It arrives here in the month of May, and feeds on whortle-berries, insects, wasps, bees, and cherries.

§ 288. The *Cedar-bird* (*Ampelis americana*) is smaller than the Robin, of a grayish-brown color, with a tuft on the head, and red spots at the extremity of the wings. It feeds on cedar-berries and insects, and is found in North America.

§ 289. The *Mocking-bird* (*Turdus polyglottus*) is of the size of a Robin, ash-colored, with white stripes on the wings, and is found from Pennsylvania as far south as the West Indies. It is distinguished for its beautiful song, as well as for its imitation of the notes of other birds. It feeds on insects and cherries.

§ 290. The *Blue-bird* (*Sylvia sialis*) is of the size of a Canary-bird; has beautiful blue wings, breast yellowish-red, white below. It is a bird of passage, which emigrates in the spring from the tropics, going as far north as New York. It feeds on insects.

§ 291. The *Salangane* (*Hirundo esculenta*) is a swal-

low, only three inches long, of a brown color, white at the extremity of the tail, and an inhabitant of China, Hindoostan, and Japan, where it builds the celebrated edible bird's-nest.

§ 292. The edible bird's-nest resembles a small saucer, divided in the middle. Its straight margin is about two inches long, the body thin: it looks like clear glue, and is semi-transparent and brittle.

§ 293. The white ones are the best, and when dissolved in chicken or mutton-broth, are considered a great delicacy, in China, Hindoostan, Japan, England, and France.

§ 294. The Salangane inhabits rocky, dark caverns, near the sea, as well as those of the interior country, where it is found by millions. They fasten their nests, which seem to be a composition of fish-spawn and several sea-plants, on the walls of those dark abodes.

§ 295. The collecting of these nests is very dangerous, and often fatal to the collector. They command a high price, selling for five dollars the pound at Canton, where their importation in one year equals a million and a half of dollars.

§ 296. The *Rice-bird*, or Boblink, or Reed-bird, (*Emberiza oryzivora*), is seven inches long, black, with white shoulders and tail, and a yellow neck.

§ 297. The Rice-bird is a bird of passage, lives during the winter in the tropics, and comes in the summer to the United States, where it is a plague to the farmer; for rice, corn, wheat, barley, and rye, are its principal food. But it has, however, three good qualities: its plumage is handsome, its warbling pleasant and musical, and its flesh the greatest delicacy.

§ 298. The *Cardinal-bird* (*Loxia cardinalis*) is nearly eight inches long, of a red color on the body, black on the throat, and with a tuft on the head. It is an inhabitant of the southern States of the Union, but is sometimes seen in the northern parts of Europe. It is known under the name of the Virginia Nightingale, on account of its sweet song.

§ 299. The *Goldfinch* (*Fringilla tristis*) is as large as a Canary-bird, of a beautiful yellow, with black wings and

tail. It is found in North America: it sings tolerably well, and feeds on insects and the seeds of thistles.

§ 300. The *Baltimore Oriole* (*Oriolus Baltimore*) is seven inches long, of a black color, intermixed with yellow, and is found during the winter in South, and in the summer in North America.

§ 301. The Baltimore Oriole is also called the Hanging-bird, on account of its skill in making a hanging nest, and is distinguished for its fine singing and beautiful plumage. Its food consists of caterpillars, beetles, and bugs.

§ 302. The *Red-winged Starling* (*Sturnus prædatorius*) is nine inches long, of a glossy-black color, with a scarlet spot on the wings, and is found in large flocks in the United States.

§ 303. The Red-winged Starlings are the most useful birds in the summer months, feeding as they do exclusively on insects. They are, however, afterwards the most notorious corn-thieves; which injury is compensated for by the use made in the fall of their delicious flesh as food.

§ 304. The *Ruby-throated Humming-bird* (*Trochilus Colubris*) is three inches long; of a golden-green above; neck red like a ruby, gray below; tail purple-red. It is an inhabitant of the tropics of America, and is the only Humming-bird which goes in the summer as far as Canada.

§ 305. The Ruby-throated Humming-bird builds its little nest with the wool of mullen and milk-weed, and lays two eggs as large as peas, which it hatches in two weeks.

§ 306. All the different species of Humming-birds are natives of the tropics of America. Their food consists of very small beetles and other insects, which they take from the bottoms of blossoms, and not of the honey found in flowers.

QUESTIONS ON SECT. XV.

§ 279. Describe Warblers.

§ 280. Describe the injury they do.

§ 281. Describe the benefit they are to us.

§ 282. At what time is it injurious to shoot them?

§ 283. When can their flesh be made use of?

§ 284. In what manner can they be caught?

§ 285. Why are they kept in cages?

- § 286. Why do they produce more melodious notes when kept in cages?
- § 287. Describe the Red-bird.
- § 288. Describe the Cedar-bird.
- § 289. Describe the Mocking-bird.
- § 290. Describe the Blue-bird.
- § 291. Describe the Salangane.
- § 292. Describe the edible bird's-nest.
- § 293. Which ones are considered the greatest delicacy?
- § 294. Where is the abode of the Salangane, and of what substances is its nest made?
- § 295. What is the principal motive for collecting those nests?
- § 296. Describe the Rice-bird.
- § 297. In what consists the injury it does, and in what the benefit?
- § 298. Describe the Cardinal-bird.
- § 299. Describe the Goldfinch.
- § 300. Describe the Baltimore Oriole.
- § 301. By what is it distinguished?
- § 302. Describe the Red-winged Starling.
- § 303. Describe its usefulness and the injury it does.
- § 304. Describe the Ruby-throated Humming-bird.
- § 305. What do you know of its nest?
- § 306. On what do Humming-birds feed?



SECTION XVI.

3d Order—CLIMBERS: (*Scansores*.)

§ 307. *Climbers* are those birds which have the outer-toe and thumb-toe of each foot directed backwards, to enable them to climb the trunks of trees; as parrots, woodpeckers, toucans, and cuckoos.

§ 308. *Parrots* are among birds what monkeys are among the mammalia, and have for several thousand years been extolled for the beauty of their plumage, and the facility with which they imitate the human voice.

§ 309. Parrots are found in the tropics, always in large flocks upon the highest trees. They feed on different kinds of grain and fruit, and are, when very young, a delicious food. They often live to the age of a hundred years.

§ 310. The Parrots of America are always of a green color, or at least some green spots are seen upon them;

those of the Old Continent are generally red, yellow, or white, and one species in New Holland is black.

§ 311. The *North American Parrot* (*Psittacus ludovicianus*) is one foot long, of a red, green, and yellow color intermixed, inhabits Louisiana, and is seen on the banks of the Mississippi and the Ohio, and as far as Lake Michigan.

§ 312. Of all birds, the Woodpeckers are the greatest insect-destroyers, and none of them should ever be killed. They are called in other countries Carpenters, on account of the sound which they produce with their hard bills, when making holes in the trunks of trees, for the purpose of taking out insects.

§ 313. The *Golden-winged Woodpecker* (*Picus auratus*) is as large as a robin; brown above, with black spots; pale-yellow with black spots below; throat yellowish-red, with a black ring on the breast; head ash-colored, with a dark-red line. This handsome bird is a native of North America.

§ 314. The *Toucan* (*Ramphastos Toro*) is two feet long, has a yellow hollow bill six inches long, and is two inches high: body black, throat white. It is an inhabitant of South America, and feeds on the seeds of a laurel-tree, called Pimento: its flesh is used as food.

QUESTIONS ON SECT. XVI.

§ 307. What birds are Climbers?

§ 308. With what animals can Parrots be compared, and for what have they been extolled?

§ 309. What is the native country of Parrots, on what do they feed, and of what use are they?

§ 310. Of what color are the Parrots of America, of the Old Continent, and New Holland?

§ 311. What is the size, color, and native country of the American Parrot?

§ 312. What do you know of Woodpeckers?

§ 313. What is the size, color, and native country of the Golden-winged Woodpecker?

§ 314. What is the size, color, native country, and food of the Toucan?

SECTION XVII.

4th Order—HEN-LIKE BIRDS: (*Gallinæ*.)

§ 315. *Hen-like* or *Gallinaceous* birds are those which have a convex bill, covered with a fleshy membrane at its base, and the forward toes partially united at the base; as the pea-fowl, turkey, guinea-hen, common hen, pigeon, partridge, and quail.

§ 316. The *Peacock* (*Pavo cristatus*) is, with its tail, four feet long; has on the head a tuft, consisting of twenty-four golden-green feathers; body golden-green and greenish-black, with rings the color of the rainbow at the end of the tail.

§ 317. The Peacock is a native of Hindoostan, but is now domesticated in all parts of the world, partly as an ornament, and partly for its flesh.

§ 318. Pea-fowls were first domesticated by Solomon, to whom they were brought from the Ganges; and afterwards they were introduced by Alexander the Great, in the third century before Christ, into Greece, from which country they have spread over all Europe.

§ 319. Young Pea-fowls are considered a great delicacy for the table, and the Roman emperor Vitellius often treated his guests with the costly dish of the brains of pea-fowls and partridges, mixed with the tongues of flamingoes.

§ 320. The Pea-hens in our climate lay from 12 to 18 yellowish spotted eggs, in the month of May; but as they are negligent in setting, it is better to place the eggs under hens, which will hatch them in four weeks.

§ 321. The Pea-fowls do not like to associate with turkeys and geese; but they are fond of the company of guinea-fowls, chickens, and ducks. They live to the age of twenty-five years.

§ 322. The *Turkey* (*Meleagris Gallopavo*) is of the size of a goose, of a dark purple-color, has a bare neck

of a red and blue color, and is a native of America, where it is still found in a wild state.

§ 323. The Turkey was introduced into Europe after the discovery of America, and is now domesticated everywhere on account of its delicate flesh.

§ 324. The Turkey-hen lays about thirty eggs in the spring, and sometimes in the month of August, which are hatched in four weeks.

§ 325. The *Guinea-hen* (*Numida Meleagris*) is twenty inches long, of a gray color, variegated with white spots, and has a small red crest upon a bluish head.

§ 326. The Guinea-hen is a native of Africa, where flocks from 200 to 300 are seen. It is everywhere domesticated on account of its eggs and wholesome flesh.

§ 327. The *Common Hen* and *Rooster* (*Phasianus Gallus*) are found wild in Hindoostan, and are of a reddish-brown color; but the domestic fowl is dispersed over almost the whole of the globe, and was first introduced into America by the Spaniards.

§ 328. The inhabitants of Egypt used in the most ancient times *breeding-stoves*, for hatching at once 2,000 and more eggs. Such *stoves* are heated by water, and kept during three weeks, day and night, at a temperature of about 90° Fahr.

§ 329. The egg consists of the *yolk*, the *white*, two skins, and a *calcareous shell*, which is covered all over with very fine pores for admitting the air. Upon the yolk is seen a little white swelling, called *treadle*, from which begins the formation of the chicken, and which may be called the *embryo*, or forming creature.

§ 330. The embryo cannot develop itself without air: it breathes at the moment of its formation, which may be proved by giving the egg a coat of gum, which will prevent the admittance of air, and suffocate the embryo.

§ 331. The natural disposition of the Rooster is war-like, and he will fight with any rival who comes in his way. Some men, availing themselves of this trait in this noble bird, excite them to fight for their amusement, until one or both are lacerated or killed: a practice in-

dicative of a rough, uneducated, low mind, and a heart destitute of humane feelings.

§ 332. Game-fighting was introduced first into Athens, by Themistocles: it is still much in vogue in England, though the ancient Britons were not at all acquainted with this barbarity; for Julius Cæsar found that people filled with such regard for the Rooster, whom they considered as the friend of the family, that they never killed him.

§ 333. The *Stock Dove* (*Columba Œnas*) is one foot long, body of a grayish-blue color, extremity of the wings and tail black, neck golden-green, breast purple-red, and is found in the rocky mountains of the Mediterranean islands, as well as in Africa and Asia.

§ 334. The *Stock Dove* is the original stock of our domestic pigeons, which have degenerated into several varieties; the principal of which are the rough-footed dove, the cropper, the tumbler, the fan-tail, and the carrier.

§ 335. The *Stock Dove*, in the wild state, breeds twice in the year, but when domestic, nine or ten times; so that a single couple would in four years produce 14,762.

§ 336. The *Passenger*, or *Wild Pigeon*, (*Columba migratoria*.) is about fourteen inches long, purple-colored, neck yellow, tail white, with two black feathers in the middle, bill black, eyes orange-color.

§ 337. The *Passenger Pigeon* is found in South as well as in North America as far north as Hudson's Bay. It is not properly a bird of passage, for they are found in Canada, and farther north in the month of December, in those countries where they find the greatest abundance of food.

§ 338. The *Passenger Pigeon* is a very swift traveller, and could probably perform the passage from here to Europe in three days. They perform a journey from Georgia or South Carolina to New York, a distance of 300 miles, in about six hours, (one mile in one minute.) This was ascertained by some one examining the crops of those which were shot near New York, in which fresh undi-

gested rice was found, which they could have obtained only in Georgia or South Carolina.

§ 339. The Passenger Pigeons are very injurious to forests; for settling upon them in flocks of many millions, they break the branches by their enormous weight. They also spoil the land, in consequence of the large quantity of manure which they deposite. Their flesh is excellent food, either fresh or salted, smoked or dried; and if it were well prepared, and put into hermetically-sealed tin boxes, it would furnish a valuable article for home consumption and foreign exportation.

QUESTIONS ON SECT. XVII.

315. What are Hen-like birds? Name the principal of them.
316. What is the external character of the Peacock?
317. What is the native country of the Peacock, and why is he domesticated?
318. Who first domesticated Pea-fowls, and by whom were they first introduced into Greece?
319. What use is, and has been made of Pea-fowls?
320. How many eggs do Pea-hens lay, and what is the best method of hatching them?
321. With what birds do Pea-fowls like to associate?
322. What is the size, color, and native country of the Turkey?
323. At what time was the Turkey introduced into Europe, and why is it now everywhere domesticated?
324. How many eggs does the Turkey lay, and in what time are they hatched?
325. What is the external character of the Guinea-hen?
326. What is the native country of the Guinea-hen, and why is she domesticated?
327. What is the native country and color of the Common Hen and Rooster?
328. What do you know of the Breeding-stove?
329. What are the different parts of an egg?
330. What is necessary to the embryo state of a fowl?
331. What is the natural disposition of a Rooster, and what opinion may be formed of those who train them to fight?
332. Who first introduced game-fighting, and how did the ancient Britons treat the Rooster?
333. What is the size, color, and native country of the Stock Dove?
334. Into what principal varieties has the Stock Dove degenerated?
335. How often does the wild Stock Dove breed, and how often the domesticated?
336. What is the size and color of the Passenger Pigeon?
337. Where is it found?
338. What kind of a traveller is the Wild Pigeon?
339. In what consists the injury done by Passenger Pigeons, and of what use are they?

SECTION XVIII.

5th Order—LONG-LEGGED BIRDS: (*Grallæ*.)

¶ 340. These birds are distinguished from the other orders by their long stilt-like legs, long neck, and short tail; as the ostrich, crane, flamingo, and snipe.

¶ 341. The long-legged birds feed on reptiles, fish, insects, and water-plants, and are mostly valuable on account of the delicate flavor of their flesh and eggs.

¶ 342. The *American Ostrich* (*Struthio Rhea*) is four feet high, has a goose-like head two inches and a half long, a body covered with gray feathers, is without a tail, weighs from 50 to 60 pounds, and is a native of Brazil and Paraguay.

¶ 343. The young American Ostrich is easily tamed, and kept in the court-yard with other fowls. Their flesh is good as food; as are also their eggs, of which one alone weighs two pounds. Their skins are used for clothing, and their feathers made into fly-brushes, or sold as ornaments to foreigners.

¶ 344. The *Crane* (*Ardea Grus*) is four feet high and three and a half long; bill four inches long, ash-colored; forehead, neck, throat, and wings black. It is a native of the northern parts of Europe and Asia, and wanders in the winter to the southern parts of Asia, Europe, and Africa.

¶ 345. Cranes and Herons are easily tamed, and can be kept in the barnyard, where they associate with the different poultry, of which they become the leaders and protectors.

¶ 346. The *Flamingo* (*Phœnicopterus ruber*) is as tall as a man; body red, and as large as that of a goose; bill four inches long, and one and a half wide; feet red, two and a half feet long; neck of the same length. It is found between the tropics in both hemispheres.

¶ 347. They live in flocks on the banks of rivers and lakes, where they feed on shell and other small fish and their spawn. Their flesh tastes like that of partridges.

§ 348. The *Snipe* (*Scolopax*) has a cylindrical bill, longer than its head, and feet almost as long as the body, usually of a brownish-red color, with black spots.

§ 349. Many species of them are found in all parts of the world. Their delicious flesh and eggs are everywhere in demand.

QUESTIONS ON SECT. XVIII.

§ 340. How are the long-legged Birds distinguished from the other Orders?

§ 341. On what do the long-legged Birds feed?

§ 342. What is the external character and native country of the American Ostrich?

§ 343. What use is made of them?

§ 344. What is the external character and native country of the Crane?

§ 345. What is the natural disposition of Cranes and Herons?

§ 346. What is the external character and native country of the Flamingo?

§ 347. In what places do they live, and on what do they feed?

§ 348. What is the external character of the Snipe?

§ 349. Where are Snipes found, and of what use are they?

SECTION XIX.

6th Order—SWIMMING BIRDS: (*Anseres*.)

§ 350. *Swimming Birds* (*Anseres*) are those birds which, on account of their webbed (palmated) feet, are able to swim.

§ 351. They live together in large flocks, more in the northern than the southern parts of the world; feed on worms, snails, fish, grass, and grain; and furnish us with quills for writing, feathers for bedding, good eggs, and wholesome flesh.

§ 352. To this Order belong the Gulls, Pelicans, Geese, Ducks, and many others.

§ 353. The *Silver Gull* (*Larus argentatus*) is two feet long, of a white color, with gray wings, and is a native of the temperate countries of America and Europe. It is also found in large numbers on the Caspian Sea.

‡ 354. This Gull is constantly seen flying over the Bay of New York and the Hudson River, busy in catching fish. The female lays her greenish-gray, brown-spotted eggs on the bare ground.

‡ 355. They sleep together, in large flocks, upon the water; and when awakened by the approach of a vessel, they produce sounds which resemble, at a distance, the talking of many men.

‡ 356. The *Pelican*, (*Pelecanus Onocrotalus*.) distinguished by an enormous bag-like crop, capable of containing twenty pounds of water, is larger than a Swan, and weighs from twenty to thirty pounds. It is of a reddish-white color, and is found in all the warmer countries of the world.

‡ 357. The Pelican has been celebrated from the most ancient times as a symbol of maternal love. They say that it tears open its breast to nourish its young with its blood. But this error originated probably from the red color of the extremity of its pointed bill, which it moves downwards, against the bag, in order to discharge from it the food for its young.

‡ 358. The *Goose* (*Anas Anser*) is two feet and a half long, weighs about ten pounds, and is of a gray color. It is a native of the temperate countries of Asia and Europe, and the original stock of our domestic Goose.

‡ 359. The Goose is one of the most useful birds in our barnyards, on account of its feathers, eggs, and flesh. The rearing of Geese might be made a source of much profit to farmers who possess uncultivated land, in which to pasture them. Goose-liver pies may be put up in hermetically-closed tin boxes, or the whole fowl smoked; thus furnishing valuable articles for home consumption or for exportation.

‡ 360. From the city of Riga are exported thousands of smoked geese every year. The goose-liver pies, prepared in the city of Strasburg, are celebrated in all parts of the world, and used as an excellent fresh food during long sea-voyages.

‡ 361. The *Canvass-back* (*Anas Vallisneria*) is a duck of about two feet long, weighs three pounds, is ash-col-

ored, mixed with black, on the head and neck reddish-brown. It is found in immense flocks in the creeks and ponds of the Chesapeake Bay, in the months of November and December.

§ 362. The Canvass-back feeds principally on the roots of the Tape-grass, (*Vallisneria*), a water-plant about eight feet long, and which is found in the creeks and ponds of the Chesapeake Bay in great abundance. The flesh of this duck is considered such a luxury, that in the markets of Philadelphia and New York a single pair brings from one to three dollars.

QUESTIONS ON SECT. XIX.

- § 350. What are Swimming Birds?
 § 351. Where do they live, on what do they feed, and what is their use?
 § 352. Name some of them.
 § 353. What is the size, color, and native country of the Silver Gull?
 § 354. Where is it frequently seen, and why?
 § 355. Describe the peculiarity in regard to their sleeping.
 § 356. Describe the Pelican.
 § 357. For what was it formerly celebrated?
 § 358. Describe the Goose.
 § 359. What use is and can be made of it?
 § 360. What use do they make of it in Riga and Strasburg?
 § 361. Describe the Canvass-back.
 § 362. On what does it feed, and what is its use?

LIST OF BIRDS FOUND IN THE STATE OF NEW YORK, AND DESCRIBED BY DOCTOR JAMES E. DE KAY, IN HIS ZOOLOGY OF NEW YORK.

1st Order : BIRDS OF PREY.

- | | |
|------------------------------|------------------------------|
| 1. The Turkey-buzzard. | 9. The Swallow-tailed Hawk. |
| 2. " Golden Eagle. | 10. " Duck Hawk. |
| 3. " Bald Eagle. | 11. " Pigeon Hawk. |
| 4. " American Fish-hawk. | 12. " American Sparrow Hawk. |
| 5. " Rough-legged Buzzard. | 13. " Slate-colored Hawk. |
| 6. " Red-tailed Buzzard. | 14. " Cooper's Hawk. |
| 7. " Red-shouldered Buzzard. | 15. " American Goshawk. |
| 8. " Broad-winged Buzzard. | 16. " Marsh Harrier. |

- | | |
|---------------------------|--------------------------|
| 17. The Hawk Owl. | 22. The Long-eared Owl. |
| 18. " Snow Owl. | 23. " Short-eared Owl. |
| 19. " Great-horned Owl. | 24. " Barred Owl. |
| 20. " Little Screech Owl. | 25. " Acadian Owl. |
| 21. " Great Gray Owl. | 26. " American Barn Owl. |

2d Order: WARBLERS.

- | | |
|--------------------------------------|--|
| 27. The Whippoorwill. | 73. The Nashville Warbler. |
| 28. " Night Hawk. | 74. " Orange-crowned Warbler |
| 29. " Chimney Swallow. | 75. " Myrtle-bird. |
| 30. " Purple Martin. | 76. " Red-poll Warbler. |
| 31. " White-bellied Swallow. | 77. " Spotted Warbler. |
| 32. " Bank Swallow. | 78. " Spotted Canada Warbler. |
| 33. " Barn Swallow. | 79. " Blue-gray Warbler. |
| 34. " Cliff Swallow. | 80. " Blackburnian Warbler. |
| 35. " Black-throated Waxwing. | 81. " Bay-breasted Warbler. |
| 36. " Cedar-bird. | 82. " Black-poll Warbler. |
| 37. " Belted Kingfisher. | 83. " Prairie Warbler. |
| 38. " Red-throated Humming-
bird. | 84. " Blue Yellow-backed War-
bler. |
| 39. " White-breasted Nuthatch. | 85. " Black-throated Blue War-
bler. |
| 40. " Red-bellied Nuthatch. | 86. " Summer Yellow-bird. |
| 41. " Brown Creeper. | 87. " Black-throated Green
Warbler. |
| 42. " Varied Creeping Warbler. | 88. " Pine Warbler. |
| 43. " House Wren. | 89. " Chestnut-sided Warbler. |
| 44. " Wood Wren. | 90. " Hemlock Warbler. |
| 45. " Mocking Wren. | 91. " Cape-May Warbler. |
| 46. " Marsh Wren. | 92. " Kentucky Warbler. |
| 47. " Winter Wren. | 93. " Hooded Warbler. |
| 48. " Short-billed Wren. | 94. " Green Black-capped War-
bler. |
| 49. " Crested Tit. | 95. " Blue-gray Gnatcatcher. |
| 50. " Black-cap Tit. | 96. " American Redstart. |
| 51. " Carolina Tit. | 97. " Small Green-crested Fly-
catcher. |
| 52. " Golden-crested Kinglet. | 98. " Yellow-bellied Flycatcher. |
| 53. " Ruby-crowned Kinglet. | 99. " Wood Pewee. |
| 54. " Blue-bird. | 100. " Phoebe-bird. |
| 55. " Common Mocking-bird. | 101. " King-bird. |
| 56. " Brown Thrush. | 102. " Olive-sided King-bird. |
| 57. " Cat-bird. | 103. " Great-crested King-bird. |
| 58. " American Robin. | 104. " Yellow-throated Greenlet. |
| 59. " Wood Thrush. | 105. " Solitary Greenlet. |
| 60. " Hermit Thrush. | 106. " White-eyed Greenlet. |
| 61. " Olive-backed Thrush. | 107. " Warbling Greenlet. |
| 62. " Wilson's Thrush. | 108. " Red-eyed Greenlet. |
| 63. " American Titlark. | 109. " Yellow-breasted Chat. |
| 64. " New York Water Thrush. | 110. " Northern Butcher-bird. |
| 65. " Oven-bird. | 111. " Blue Jay. |
| 66. " Yellow Throat. | 112. " Canada Jay. |
| 67. " Mourning Warbler. | 113. " Magpie. |
| 68. " Worm-eating Warbler. | 114. " Common Crow. |
| 69. " Whistling Warbler. | |
| 70. " Blue-winged Warbler. | |
| 71. " Golden-winged Warbler. | |
| 72. " Tennessee Warbler. | |

- | | |
|--------------------------------|--------------------------------|
| 115. The Raven. | 137. The Chip-bird. |
| 116. " Fish Crow. | 138. " Tree Bunting. |
| 117. " Common Crow Black-bird. | 139. " Savannah Bunting. |
| 118. " Rusty Crow Black-bird. | 140. " Blue-striped Bunting. |
| 119. " Meadow Lark. | 141. " Seaside Finch. |
| 120. " Golden Oriole. | 142. " Quail-head. |
| 121. " Orchard Oriole. | 143. " Swamp Finch. |
| 122. " Red-winged Oriole. | 144. " American Goldfinch. |
| 123. " Cow-bunting. | 145. " Pine Finch. |
| 124. " Boblink. | 146. " Lesser Red-poll. |
| 125. " Blue Grosbeak. | 147. " Mealy Red-poll. |
| 126. " Rose-breasted Grosbeak. | 148. " Cardinal Grosbeak. |
| 127. " Snow-bird. | 149. " Ground Robin. |
| 128. " Fox-colored Sparrow. | 150. " Indigo-bird. |
| 129. " Song Sparrow. | 151. " Red-bird. |
| 130. " Bay-winged Sparrow. | 152. " Black-winged Red-bird. |
| 131. " White-throated Sparrow. | 153. " Lapland Snow-bird. |
| 132. " White-crowned Sparrow. | 154. " White Snow-bird. |
| 133. " Black-throated Bunting. | 155. " Horned Lark. |
| 134. " Yellow-winged Bunting. | 156. " Pine Bulfinch. |
| 135. " Varied Bunting. | 157. " American Crossbill. |
| 136. " Field Bunting. | 158. " White-winged Crossbill. |

3d Order : CLIMBERS.

- | | |
|-----------------------------------|----------------------------------|
| 159. The Crested Woodpecker. | 165. The Arctic Woodpecker. |
| 160. " Red-headed Woodpecker. | 166. " Banded Woodpecker. |
| 161. " Hairy Woodpecker. | 167. " Golden-winged Woodpecker. |
| 162. " Dawny Woodpecker. | 168. " Yellow-billed Cuckoo. |
| 163. " Yellow-bellied Woodpecker. | 169. " Black-billed Cuckoo. |
| 164. " Red-bellied Woodpecker. | |

4th Order : HEN-LIKE BIRDS.

- | | |
|------------------------------|----------------------------|
| 170. The Wild Pigeon. | 174. The Common Partridge. |
| 171. " Carolina Turtle-dove. | 175. " Pinnated Grouse. |
| 172. " Wild Turkey. | 176. " Spruce Grouse. |
| 173. " American Quail. | |

5th Order : LONG-LEGGED BIRDS.

- | | |
|---------------------------------|------------------------------------|
| 177. The American King Plover. | 191. The Green Heron. |
| 178. " Piping Plover. | 192. " Small Bittern. |
| 179. " Wilson's Plover. | 193. " American Bittern. |
| 180. " Killdeer Plover. | 194. " Black-crowned Night Heron. |
| 181. " Golden Plover. | 195. " Yellow-crowned Night Heron. |
| 182. " Whistling Plover. | 196. " White Ibis. |
| 183. " Turnstone. | 197. " Glossy Ibis. |
| 184. " American Oyster-catcher. | 198. " Long-billed Curlew. |
| 185. " American Crane. | 199. " Jack Curlew. |
| 186. " Great Blue Heron. | 200. " Esquimaux Curlew. |
| 187. " Great White Heron. | 201. " Long-legged Sandpiper. |
| 188. " White-crested Heron. | 202. " Semi-palmated Sandpiper. |
| 189. " Blue Heron. | |
| 190. " Louisiana Heron. | |

- | | |
|----------------------------------|---------------------------------|
| 203. The Purple Sandpiper. | 221. The Common American Snipe. |
| 204. " Buff-breasted Sandpiper. | 222. " American Woodcock. |
| 205. " Curlew Sandpiper. | 223. " Salt-water Meadow-hen. |
| 206. " Black-breasted Sandpiper. | 224. " Fresh-water Meadow-hen. |
| 207. " Schinz's Sandpiper. | 225. " Mud-hen. |
| 208. " Pectoral Sandpiper. | 226. " Sora Rail. |
| 209. " Red-breasted Sandpiper. | 227. " New York Rail. |
| 210. " Wilson's Sandpiper. | 228. " Florida Gallinule. |
| 211. " Sanderling. | 229. " Lawyer. |
| 212. " Spotted Sand-Lark. | 230. " American Avoset. |
| 213. " Gray Plover. | 231. " Red Phalarope. |
| 214. " Yellow-legs. | 232. " Hyperborean Lobefoot. |
| 215. " Solitary Tattler. | 233. " Wilson's Holopode. |
| 216. " Varied Tattler. | 234. " American Coot. |
| 217. " Willet. | 235. " Horned Crebe. |
| 218. " Marlin. | 236. " Crested Crebe. |
| 219. " Ring-tailed Marlin. | 237. " Red-necked Crebe. |
| 220. " Dowitcher. | 238. " Dipper. |

6th Order: SWIMMING BIRDS.

- | | |
|---------------------------------------|----------------------------------|
| 239. The Black Guillemot. | 273. The Red-breasted Sheldrake. |
| 240. " Foolish Guillemot. | 274. " Hooded Sheldrake. |
| 241. " Sea-dove. | 275. " Canvass-back. |
| 242. " Arctic Puffin. | 276. " Red-head. |
| 243. " Razor-bill. | 277. " Broadbill. |
| 244. " Great Loon. | 278. " Creek Broadbill. |
| 245. " Red-throated Loon. | 279. " Bastard Broadbill. |
| 246. " Large Shearwater. | 280. " Pied Duck. |
| 247. " Little Shearwater. | 281. " Ruddy Duck. |
| 248. " Wilson's Petrell. | 282. " Old-wife. |
| 249. " Forked-tailed Petrell. | 283. " Buffle-headed Duck. |
| 250. " Cormorant. | 284. " Whistler Duck. |
| 251. " Double-crested Cormo-
rant. | 285. " Harlequin Duck. |
| 252. " Brown Pelican. | 286. " Eider Duck. |
| 253. " American Gannet. | 287. " King Duck. |
| 254. " Black Skimmer. | 288. " Surf Duck. |
| 255. " Common Fern. | 289. " Broad-billed Coot. |
| 256. " Cayenne Fern. | 290. " White-winged Coot. |
| 257. " Black Fern. | 291. " Wood Duck. |
| 258. " Marsh Fern. | 292. " Blue-winged Teal. |
| 259. " Arctic Fern. | 293. " Green-winged Teal. |
| 260. " Sandwich Fern. | 294. " Pin-tail Duck. |
| 261. " Roseate Fern. | 295. " Spoonbill. |
| 262. " Silvery Fern. | 296. " Gray Duck. |
| 263. " Winter Gull. | 297. " Black Duck. |
| 264. " Great Black-backed Gull. | 298. " American Widgeon. |
| 265. " Laughing Gull. | 299. " European Widgeon. |
| 266. " Bonaparte's Gull. | 300. " Mallard. |
| 267. " Fork-tailed Gull. | 301. " Wild Goose. |
| 268. " Three-toed Gull. | 302. " White-fronted Goose. |
| 269. " Arctic Hawk-Gull. | 303. " Snow Goose. |
| 270. " Richardson's Hawk-Gull. | 304. " Brant. |
| 271. " Pomarine Hawk-Gull. | 305. " Hutching's Goose. |
| 272. " Buff-breasted Sheldrake. | 306. " American Swan. |

SOURCES OF REFERENCE FOR THE NATURAL HISTORY OF BIRDS.

Pennant's British Zoölogy.....	1786
Wilson's American Ornithology.....	1803
T. F. Blumenbach's Handbuch der Naturgeschichte.....	1825
Audubon's Birds of America.....	1832
L. Oken's Naturgeschichte für alle Stände.....	1832
Cuvier Regne Animal.....	1817
James E. De Kay's Zoölogy of New York.....	1842

SECTION XX.

III. ERPETOLOGY.

§ 363. *Erpetology* is the science which treats of Reptiles.

§ 364. *Reptiles* are oviparous, breath through lungs, and have red cold blood.

§ 365. Reptiles are divided into four Orders, viz :

1. Snakes : (Ophidia.)
2. Lizards : (Sauria.)
3. Tortoises : (Chelonia.)
4. Frogs : (Batrachia.)

§ 366. Reptiles are found in the water, salt or fresh, and on land. Of those living on land, some choose its marshes and swamps, while others prefer dry and elevated places and the branches of trees. Nearly all of them swim with the greatest facility. On account of this ability to live in water and on land, they are called Amphibia.

§ 367. Reptiles are found in all parts of the world, but their number is more considerable in warm and tropical countries, than in the northern, where, in the winter season, they become torpid.

§ 368. The most remarkable facts in connection with Reptiles. are their power of *reproduction*, their *tenacity of life*, and their *abstinence from food*.

§ 369. Reptiles have the power of *reproducing*, after a certain time, the tail or limbs, and even the eyes, should they be deprived of them.

§ 370. That they have a very *tenacious* life, is seen in the case of the tortoise, which continues to live six months and more after its brain is removed, and several days after its head is cut off, or its heart taken out.

§ 371. Reptiles can *abstain* from food several months, and some of them even longer than a year; the cause of which may be their cold blood; for they do not perspire, and therefore lose nothing by perspiration, and they digest very slowly.

§ 372. Reptiles are generally carnivorous, and devour every thing they can conquer. A few of them are herbivorous, and eat grass or fruits, as the Green-turtle, some Land-tortoises, and the Iguana Lizard.

§ 373. The instinct of Reptiles is very inferior to that of mammalia, birds, or insects. They build no nests for their young, but lay their eggs in the sand or in the water, which are hatched out by the heat of the sun. There exists no paternal or maternal feelings among them; and, excepting the crocodiles and some kinds of snakes, they form no society.

§ 374. The eggs of Reptiles vary in size. The eggs of the crocodile are as large as those of the goose; while those of frogs are not larger than the head of a pin.

§ 375. The flesh of some tortoises, of the Iguana Lizard, and of frogs, is used for food: beyond this, and the fact that many of them destroy immense numbers of various insects, reptiles are apparently useless animals, and man could dispense with their existence without inconvenience.

QUESTIONS OF SECT. XX.

§ 363. What is Erpetology?

§ 364. What are Reptiles?

§ 365. Name the Orders of Reptiles.

§ 366. What do you know of the resort of Reptiles, and why are they called Amphibia?

§ 367. In what parts of the world are they found?

§ 368. What are the remarkable facts in relation to Reptiles?

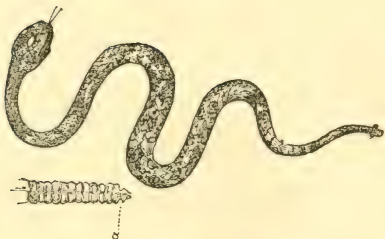
§ 369. What do you know of their reproduction?

§ 370. What do you know of their tenacious life?

371. What do you know of their abstinence from food?
372. On what do they feed?
373. What do you know with regard to their instinct?
374. What is the size of their eggs?
375. Of what use are Reptiles?

1st Order.—SNAKES.

Fig. 21.



THE RATTLESNAKE.—(*Crotalus horridus*.)

2d Order.—LIZARDS.

Fig. 22.



THE GREEN LIZARD.—(*Lacerta agilis*.)

3d Order.—TORTOISES.

Fig. 23.

THE TURTLE.—(*Testudo radiata.*)

4th. Order.—FROGS

Fig. 24.

THE COMMON TOAD.—(*Bufo vulgaris.*)

SECTION XXI.

1st Order—SNAKES: (*Ophidia.*)

§ 376. *Snakes*, (*Ophidia*.) are those Reptiles which have the whole body covered with scales, and which have no legs.

§ 377. The rapid motion of Snakes is effected by their *vertebræ*, their *scales* and the *elasticity* of their body.

§ 378. Their vertebræ are arranged in such a manner that the animal is able to turn itself in any direction, and even to coil itself like a rope. Each scale is provided with a muscle, by which they are enabled to move them like so many feet. On account of the elasticity of their body, they bend parts of it in the form of arches; and by bringing together the extremities of these, which touch the ground, one serves as a supporting point in order to project the other with the rapidity of an arrow.

§ 379. Snakes are subject to a torpidness during the winter; but as soon as the first warm days of the spring appear, they regain their former activity. This awaking is like a regeneration, because at the same time they cast off entirely their old skin, and a new one with fresh colors covers their glittering body.

§ 380. The powerful imagination of the ancients regarded this annual casting of the old skin as the laying aside of old age, and as a regeneration. They therefore represented eternity under the symbol of a snake in the form of a circle; indicating, that eternity, like a circle, has neither beginning nor end.

§ 381. Many snakes inspire a general horror; partly on account of their great strength and ferocity; and partly on account of the venom with which many of them are provided.

§ 382. Snakes which are venomous have flat scales on their heads, and a tail five or six times shorter than their body. They are also distinguished from the other reptiles by being viviparous; as for instance the rattlesnake and the viper, (a contraction of the word *viviparous*.)

§ 383. Venomous Snakes are provided with fangs, which are teeth of a tubular structure, and generally much larger than the others, situated in the anterior part of the upper jaw, and so articulated, as to be elevated or depressed at the pleasure of the animal.

§ 384. These fangs are hooked, like the tusks of a hog. On each fang is a longitudinal opening near its root, below which is the venom-bag, from which the poison is discharged into the wound when the animal strikes its victim.

§ 385. If we wish to determine the existence or non-existence of the fangs, it can be done with a pin or other hard instrument, which is to be drawn from the hind part of the upper jaw to the angle of the mouth; which operation may be tried on each side. In this way the fangs or venomous teeth may be raised up and discovered.

§ 386. Either of the following remedies for the bite of venomous snakes, may be used, in case a physician is not immediately at hand; viz: 1. Sucking the wound: 2. Plunging the bitten part into water, with a large quantity of salt: 3. Plunging it into well-heated spirits of turpentine during some time: 4. Drinking freely of a decoction made of vein-leaf, hawk-weed, or blood-wart, (*hieracium venosum* :) 5. A teaspoonful of spirits of hartshorn mixed with water and poured down the throat.

§ 387. Snakes are eaten by the Indians, and also by a large number of Egyptians. Many persons eat them, when salted and smoked, as a delicacy. The ancient physicians recommended the eating of snakes as a preventive against leprous diseases, and elephantiasis.

§ 388. The *Northern Rattlesnake* (*Crotalus durissus*) is distinguished by having a tail which terminates with a horny appendix, with which it produces a sound as with a rattle. It is sometimes six feet long, brown above, yellowish below, and with black dots; and is a native of the United States.

§ 389. The *Boa Constrictor* is, when adult, from forty to fifty feet long, has six-sided blackish spots upon the back, is a native of America, Asia, and Africa, and is, perhaps, the same species with the *Amaru* of South America.

§ 390. These gigantic snakes have become less common now than they were some centuries back; for in proportion as cultivation and population increase, noxious animals are driven into more distant and uncultivated tracts.

§ 391. The *Boa Constrictor* is probably the same species which is mentioned by Livy, who says that near the river Bagrada, in Africa, a snake was seen of such an enormous size as to prevent the use of the river by the

army of Attilius Regulus, and which, after devouring several soldiers, and in other ways killing a number of them, was at length destroyed by the force of military engines and showers of stones. This snake was regarded by the whole army as a more formidable enemy than even Carthage itself. The skin of the monster, he says, measured 120 feet in length, and was sent to Rome as a trophy.

§ 392. The *Black-snake* (*Coluber Constrictor*) is three feet long, bluish-black above, slate-colored, or bluish-white, below; the margin of the jaws, chin, and throat white; and is found from the Gulf of Mexico to Canada.

§ 393. The Black-snake is not venomous, but it is a wild and bold animal, which will pursue an enemy. It climbs trees in search of eggs and birds; it feeds also on frogs, toads, and the larger insects.

§ 394. The *Milk-snake* (*Coluber eximius*) is about two feet long, covered with numerous chestnut-colored spots, bordered with black, and is an inhabitant of the United States, where it is found upon trees and in cellars and dairies. It is entirely harmless.

§ 395. The *Copperhead*, (*Trigonocephalus Contortrix*), or Moccasin, Red Adder, or Red Viper, is about two feet long, copper-brown above, with reddish-brown bands, and is an inhabitant of the Southern, Western, and Middle States. It is very venomous.

§ 396. The *Water-snakes* live in the sea and even in the mouth of rivers, where they become dangerous to those who are bathing. They are distinguished from the other snakes by having a flat, compressed tail. They are most venomous, from two to twelve feet long, and inhabitants of the tropics.

§ 397. The existence of a gigantic Sea-Serpent in the northern seas was for several centuries believed by many persons, but denied by the greater part of naturalists; yet it has many arguments in its favor. As there have been created among Mammalia, the diminutive Mouse and the gigantic Black Whale; among Birds, the Hummingbird and the colossal Ostrich; among Fishes, the Sardin and the thirty-feet-long Shark, it is not improbable that

among the different species of Water-snakes, also, there exists one of a gigantic size.

§ 398. Pontoppidan, who published, in 1755, a Natural History of Norway, says, that every one in Norway is so firmly convinced of the existence of a gigantic Sea-serpent, several hundred feet in length, that it would excite laughter to hint a belief to the contrary.

§ 399. Nicolaus Cramius, minister of the gospel at London in Norway, says, that he with several fishermen had seen, Jan. 6th, 1656, at a distance from the shore a Sea-serpent, the length of which was thought to be 300 feet.

§ 400. Paul Egede, Danish Missionary to Greenland, says, that on his second voyage to that country he saw a Sea-monster, raising its head as high as the mast; it had a long pointed mouth, and its body was covered with scales, and terminated in a tail similar to a serpent.

§ 401. Captain Laurant de Ferry, of Bergen in Norway, says, that in 1746, returning from a voyage from Trundhin, he and his sailors saw a Sea-serpent of an enormous size, so near his vessel, that he shot at and wounded it.

§ 402. The Rev. M. Maclean, of the Hebrides Islands, reported to the Wernerian Society, in 1808, that near the shore of Eigg, at a distance of half a mile, he was pursued in his boat by an enormous Sea-monster; but reaching in haste the shore, and having climbed upon a high rock, he saw that it was a serpent at least from seventy to eighty feet long.

§ 403. When the news was spread abroad that a Sea-serpent had been seen on the shores of North America, a committee of the Linnean Society of Boston reported, in the month of August, 1817, that they had observed in the Bay of Gloucester, off Cape Ann, in the state of Massachusetts, an enormous Sea-monster of a serpentine form.

§ 404. The Captain and the ship's company of the ship Havre, which arrived at New Orleans from Havre, in 1837, stated, that they saw in lat. $25^{\circ} 32'$, about 100 feet

from the ship, a Sea-serpent of an immense length, the head of which was shaped like that of a Flying-fish.

§ 405. The Sea-serpent, as lately as 1848, was distinctly seen by an English man-of-war, the report of which has not yet been published.

QUESTIONS ON SECT. XXI.

- § 376. What are Snakes?
- § 377. How is the rapid motion of Snakes effected?
- § 378. In what manner are the vertebrae of Snakes arranged? With what is each scale of the body of the Snake provided, and why? What do you know of the elasticity of the body of Snakes?
- § 379. To what are Snakes subject during the winter, and to what can this awaking be compared?
- § 380. How did the strong imagination of the ancients regard the annual awaking of Snakes?
- § 381. Why do Snakes inspire a general horror?
- § 382. What Snakes are venomous?
- § 383. With what are venomous Snakes provided?
- § 384. What is the character of the fangs of Snakes? Describe them.
- § 385. How can the existence or non-existence of fangs in Snakes be discovered?
- § 386. What are the different remedies for the bite of venomous Snakes?
- § 387. What use is made of Snakes?
- § 388. How is the Rattlesnake distinguished? Describe it.
- § 389. What is the size, color, and native country of the Boa-constrictor?
- § 390. Why have those gigantic Snakes become less common now?
- § 391. What says Livy of the Boa-constrictor?
- § 392. What is the size, color, and native country of the Black-snake?
- § 393. What is the nature of the Black-snake?
- § 394. What is the size, color, native country, and nature of the Milk-snake?
- § 395. What is the size, color, native country, and nature of the Copper-head?
- § 396. Where do Water-snakes live, and how are they distinguished from others?
- § 397. What can you say of the gigantic Sea-serpent? Is it probable that a gigantic Sea-serpent exists?
- § 398. What did Pontoppidan say of the gigantic Sea-serpent?
- § 399. What says Nicolaus Cramius of it?
- § 400. What does Paul Egede relate of it?
- § 401. What does Captain Laurent de Ferry say of it?
- § 402. What does Rev. M. Maclean report of it?
- § 403. How did the Linnean Society of Boston report of it?
- § 404. In what does the report of the ship Havre consist with respect to it?
- § 405. What is the latest account we have of the gigantic Sea-serpent?

SECTION XXII.

2d Order—LIZARDS: (*Sauria*.)

§ 406. Reptiles which, like snakes, are covered with scales, but which are provided with four legs, are called *Lizards*, (*Sauria*.)

§ 407. The largest Lizards are the Crocodiles, which are found in Africa, America, and Asia; those of Africa are distinguished by a prolonged flat snout, those of America by a wide and round one, and those of East India by a pointed one, like the beak of a bird.

§ 408. The *Crocodile of the Nile* (*Crocodilus niloticus*) is the largest known Reptile. An adult one is thirty feet long or more; it has a very short moveable tongue, from 72 to 80 conical teeth in both jaws, and a strong odor of musk, which indicates its presence at the distance of several miles.

§ 409. The Crocodile attracted the attention of the most distinguished philosophers of antiquity. The wealthy Scourus, who, 58 years before Christ, sent to Africa for a River-horse and five Crocodiles, was the first to introduce this animal into Rome. The Emperor Augustus exhibited an African Crocodile in his triumph over Cleopatra, as well as several others for the entertainment of the people.

§ 410. The ancient Egyptians considered the Crocodile as a sacred animal, because it prevented the robbers of Arabia and Lybia from crossing the river Nile; and Diodorus Siculus says that when king Minas fell with his horse into the lake Mæris, he was saved by a Crocodile, which carried him out on its back.

§ 411. The Crocodiles feed principally on fish, crabs, and such other animals as they can catch. Their flesh, which is as white as snow, is eaten by many people. They are caught with strong hooks, or by shooting them in the eye.

§ 412. It is said that the Crocodile, on seeing a human

being, sheds tears, but after a few moments, devours him. Hence the term, "Crocodile tears," to designate the grief of a hypocrite, who pretends to feelings he does not possess.

¶ 413. The Crocodiles of America, of which there are several distinct species, are called *Alligators* in the Southern States, and *Cayman* in the Antilles and South America. Those of Asia are known under the name of *Gavials*.

¶ 414. The *Guana* (*Iguana tuberculata*) is nearly five feet long; above, yellowish-green and marble-colored. It is an inhabitant of the West India islands and South America, and is found upon trees, feeding on fruit, leaves, and insects.

¶ 415. It is a mild, harmless lizard, and is easily tamed. Its flesh, which is eaten, tastes like that of the Green Turtle; but it is considered very unwholesome.

¶ 416. The *Chameleon*, (*Lacerta Chamæleon*), the most singular of the Lizards, is one foot long, looks like a skeleton, is covered with a skin, has a ring-tail, large eyes, and a very long tongue. It is found in the northern parts of Africa and the southwest of Asia.

¶ 417. The Chameleon changes its color about every ten minutes. This may perhaps be effected by the expansion of its lungs, or by its blood, which, when excited, enters the skin; or it may be provided with a certain coloring matter, which it can move at pleasure in its skin.

¶ 418. The Chameleon is a symbol, by which is represented the low complaisance of flatterers and courtiers; and a man who changes his principles and opinions according to his convenience or interest, is called a chameleon.

¶ 419. The *Brown Swift*, (*Tropidolepis undulata*), thus called on account of its rapid motions, is a small lizard, about seven inches long, of a brownish color, with undulating bands and green beneath; and is found principally upon pine-trees, from Florida to New York. It is harmless, and feeds on insects.

QUESTIONS ON SECT. XXII.

- 406. What are Lizards?
- 407. Describe the Crocodiles of Africa, America, and Asia.
- 408. Describe the Crocodile of the Nile.
- 409. By whom and for what purpose was it brought to Rome?
- 410. What idea had the ancient Egyptians of it?
- 411. On what does it feed, and in what manner is it caught?
- 412. What is meant by "Crocodile tears?"
- 413. What are Alligators, Caymans, and Gavials?
- 414. Describe the Guana.
- 415. What is its disposition and use?
- 416. Describe the Chameleon.
- 417. How is the change of its color effected?
- 418. What person may be called a Chameleon?
- 419. Describe the Brown Swift?

SECTION XXIII.

3d Order—TORTOISES: (*Chelonia*.)

¶ 420. *Tortoises* (*Chelonia*) are those Reptiles which have a covering, consisting of a shell, on the back, as well as on the breast. They walk on four legs, or swim with the aid of four fins. They have no teeth, but very strong horny jaws, and swallow their food without masticating it. Though some are herbivorous, they are mostly carnivorous, and can live without food a very long time.

¶ 421. Tortoises live to a great age; one for instance lived in the Archiepiscopal garden at Lambeth, in England, from 1633 to 1753, or one hundred and twenty years.

¶ 422. The astonishing tenacity of the life of Turtles was proved, by making a large opening in the skull of one, drawing out all the brain, and washing the cavity, so as to leave not the smallest part remaining. The turtle, after having been thus injured, walked away, closed its eyes, which so remained, and continued to live without a brain for six months.

¶ 423. The head of another being cut off, it lived for

twenty-three days ; and on opening the body twenty days after, the motion of the heart was perceptible.

‡ 424. The *Green Turtle* (*Chelonia Midas*) weighs, when full grown, eight hundred pounds, has a shell of a pale olive-green color, and lives in the tropical seas of America and Africa. It is sometimes seen in the Bay of New York, and even in the waters of England. It feeds solely on sea-weeds, and hence the delicacy of its flesh.

‡ 425. The *Soft-shelled Turtle* (*Trionyx ferox*) is about nine inches long, and has a dark slate-colored cartilaginous shell with numerous spots. It is found in the lakes and western rivers of the United States, and is esteemed a wholesome article of food.

‡ 426. The *Snapping-turtle*, the *Painted*, the *Spotted*, and the *Mud Turtle*, with the *Terrapin* and *Box-turtle*, are the best-known among the many other species of the United States.

QUESTIONS ON SECT. XXIII.

- § 420. What is the essential character of the Tortoise? Describe it.
- § 421. How can you prove that Tortoises live to a very great age?
- § 422. How was the tenacity of life of a Tortoise shown?
- § 423. What was the result when the head was cut off?
- § 424. What is the weight, color, native country, food, and use of the Green Turtle?
- § 425. What is the size, color, abode, and use of the Soft-shelled Turtle?
- § 426. What Turtles of the United States are the best known?



SECTION XXV.

4th Order—FROGS: (*Batrachia*.)

‡ 427. All Reptiles, which are covered with a soft skin, and provided with two or four feet, belong to the Order *Batrachia*; as frogs, toads, sirens, and salamanders.

‡ 428. The *Bullfrog* (*Rana pipiens*) is eight inches long, measures three and a half inches across the body,

and has hind legs one foot and a half long. Its color is brown, mixed with green; yellowish-white beneath. It is an inhabitant of the United States. Its flesh is very palatable.

§ 429. The Bullfrog, as well as all the other species of frogs, deposit their spawn, which consists of a clustered mass of gelatinous, transparent eggs, in number from 600 to 1,200, in the water, in the month of March or April, according to the temperature of the atmosphere.

§ 430. The spawn of the frog lies a month or longer, according to the temperature of the water, before the embryo is developed; during which period each egg gradually enlarges, and a few days before the time of exclusion, the young animal may be perceived moving about in the surrounding gluten.

§ 431. When first hatched, they feed on the remains of the gluten in which they were imbedded, and in the space of a few days they will be found to be furnished on each side of the head with a pair of ramified gills; in this state they are called *Tadpoles*.

§ 432. The Tadpole, perfectly unlike the animal in a complete state, consists merely of a large, roundish, black head, and a slender tail.

§ 433. Tadpoles are extremely lively in their motions, and are often seen in such numbers, as to blacken the water with their legions. They live on the leaves of small water-plants.

§ 434. When the Tadpole has arrived at the age of about five or six weeks, the hind legs make their appearance, gradually increasing in length and size. These, in about a fortnight afterwards, are succeeded by the fore-legs: the tail begins then to decrease, and altogether disappears in the space of two days.

§ 435. As soon as Tadpoles have lost their gills and tail, and are provided with legs, they venture upon land; sometimes in such multitudes as to cover a space of many yards in extent; which phenomenon occasioned the popular belief, that frogs or toads descend from the clouds, during showers.

§ 436. Frogs can hardly be said to arrive at their full size till about the age of five years, and they live at least fifteen years.

§ 437. Frogs are extremely tenacious of life. The heart and entrails may be torn out of the body of a Frog without appearing to cause the animal a great degree of suffering, and without producing death until after the expiration of some hours. The heart shows signs of sensibility for many days after life has ceased in other parts.

§ 438. The *American Toad* (*Bufo Americanus*) has a thick swollen body, covered with numerous reddish warts. It is found towards evening and during the night in gardens, meadows, and fields, where it feeds on noxious insects, caterpillars, and worms, and is therefore very useful to man. It is met with in all parts of the United States.

§ 439. Toads, like frogs, in the early part of spring deposit their spawn in the water, in the form of strings three or four feet long: from these proceed the Tadpoles, which live in the water; and which, after several weeks, are metamorphosed into their perfect state, when they live on the land.

§ 440. The acrimonious fluid which the Toad exudes from its warts is innoxious, and perfectly free from any venomous property; as is proved by the fact that it has never produced any bad symptoms in animals that have tasted or even swallowed it.

§ 441. That Toads have been found in the heart of solid rocks, and in the centre of growing trees, where they had been entombed for centuries, without air or sustenance of any kind, is entirely contradictory to the nature of this animal, which cannot live for any considerable length of time without food and air. Such accounts, it is most likely, have their origin in the love of the marvellous, and in the neglect of a minute inspection, at the moment, of the parts surrounding the spot where it was discovered.

§ 442. That the Toad is not able to live without air and food any considerable time, was proved by the following experiments: Three Toads were enclosed in as

many boxes, which were immediately covered with a thick coat of mortar. In this manner they were kept for eighteen months; when, on opening the boxes, only two of them were found still living. These were immediately re-enclosed; but being again opened some months after, it was discovered that they had perished.

QUESTIONS ON SECT. XXIV.

427. What Reptiles belong to the Order Batrachia?
 428. What is the size, color, and native country of the Bullfrog?
 429. At what time and where, does the Frog deposit its eggs, and in what form? What is their number?
 430. What do you know of the development of the Frog's young?
 431. On what do the young Frogs feed; and what are Tadpoles?
 432. What is the appearance of Tadpoles?
 433. What is said of the motions of Tadpoles? In what numbers are they seen, and on what do they feed?
 434. In what time, and how, are Tadpoles metamorphosed into perfect Frogs?
 435. What phenomenon produced the belief that Frogs descend from the clouds during showers?
 436. At what age are Frogs full-grown?
 437. What facts show that Frogs are extremely tenacious of life?
 438. What do you know of the external character, abode, and food of the American Toad?
 439. When, where, and how do Toads deposit their spawn?
 440. Of what character is the fluid of the warts of the Toad?
 441. What do you think of the fact, that Toads have been found in the heart of solid rocks or in growing trees?
 442. What experiments have been made to show the impossibility of Toads living a long time without air or food?

LIST OF REPTILES FOUND IN THE STATE OF NEW YORK, AND DESCRIBED BY DOCTOR JAMES E. DE KAY, IN HIS ZOOLOGY OF NEW YORK.

1st Order: SNAKES.

- | | |
|-------------------------|------------------------------|
| 1. The Black-snake. | 9. The Yellow-bellied Snake. |
| 2. " Pilot Black-snake. | 10. " Small Brown-snake. |
| 3. " Chain-snake. | 11. " Ribbon-snake. |
| 4. " Milk-snake. | 12. " Red-snake. |
| 5. " Ring-snake. | 13. " Hog-nosed Snake. |
| 6. " Grass-snake. | 14. " Copperhead. |
| 7. " Water-snake. | 15. " Northern Rattlesnake. |
| 8. " Striped-snake. | |

2d Order: LIZARDS.

- | | |
|----------------------------|----------------------|
| 16. The Blue-tailed Skink. | 17. The Brown Swift. |
|----------------------------|----------------------|

3d Order: TORTOISES.

- | | |
|----------------------------|-----------------------------------|
| 18. The Green Turtle. | 27. The Red-bellied Terrapin. |
| 19. " Leather Turtle. | 28. " Muhlenberg's Tortoise. |
| 20. " Soft-shelled Turtle. | 29. " Geographic Tortoise. |
| 21. " Snapping-turtle. | 30. " Pseudo-geographic Tortoise. |
| 22. " Salt-water Terrapin. | 31. " Mud Tortoise. |
| 23. " Smooth Terrapin. | 32. " Musk Tortoise. |
| 24. " Painted Tortoise. | 33. " Common Box Tortoise. |
| 25. " Spotted Tortoise. | 34. " Blanding's Box Tortoise. |
| 26. " Wood Terrapin. | |

4th Order: FROGS.

- | | |
|----------------------------------|------------------------------------|
| 35. The Bullfrog. | 50. The Salmon-colored Salamander. |
| 36. " Large Northern Bullfrog. | 51. " Blotched Salamander. |
| 37. " Spring-frog. | 52. " Long-tailed Salamander. |
| 38. " Shad-frog. | 53. " Granulated Salamander. |
| 39. " Wood-frog. | 54. " Striped-back Salamander. |
| 40. " Hermit Spade-foot. | 55. " Red Salamander. |
| 41. " American Toad. | 56. " Scarlet Salamander. |
| 42. " Pickering's Hylodes. | 57. " Blue-spotted Salamander. |
| 43. " Cricket Hylodes. | 58. " Tiger-triton Salamander. |
| 44. " Northern Tree-toad. | 59. " Crimson-spotted Triton. |
| 45. " Squirrel Tree-toad. | 60. " Dusky Triton. |
| 46. " Yellow-bellied Salamander. | 61. " Gray-spotted Triton. |
| 47. " Violet-colored Salamander. | 62. " Banded Proteus. |
| 48. " Red-backed Salamander. | 63. " Allegany Hell-bender. |
| 49. " Painted Salamander. | |

AUTHORITIES FOR THE NATURAL HISTORY OF REPTILES.

C. de Lacepede, *Histoire Naturelle de Quadrupèdes ovipares et de Serpens.*

A. Brongniart, *Classification des Reptiles.*

Th. Pennant's *British Zoology.*

L. Oken's *Allgemeine Naturgeschichte für alle Stände.*

Annals of the Lyceum of Natural History of New York.

Blumenbach's *Handbuch der Naturgeschichte.*

Le Conte's Description of the Species of North American Tortoises.

Harlan's *Genera of North American Reptiles.*

Holbrook's *North American Erpetology.*

Fontana, *Sulla Storia Naturale dei Serpenti.*

James E. De Kay's *Zoology of New York.*

SECTION XXV.

IV. ICHTHYOLOGY.

§ 443. *Ichthyology* is the science which treats of Fishes; and forms the fourth class in the Animal Kingdom.

§ 444. Fish, like Reptiles, have cold red blood; they live in water, breathe by means of gills, are provided with fins instead of feet for executing their motions, and are oviparous.

§ 445. The fins consist of several rays connected by a tender membrane, and, according to their position, have five different names, viz. : Dorsal, Pectoral, Ventral, Anal, or Caudal.

§ 446. *Dorsal fins* are those which are situated upon the back, (Pinnæ dorsales.)

The *Pectoral fins* are situated on both sides, near the gills, (Pinnæ pectorales.)

Ventral fins are those which are situated beneath, on both sides before the anus, (Pinnæ ventrales.)

The *Anal fin* is that which is situated beneath, near the tail, (Pinna analis.)

The *Caudal fin* is situated at the extremity of the body, and constitutes the tail, (Pinna caudalis.)

§ 447. The *Gills* (Branchiæ) are the breathing organs, and consist of arched rays, usually four on each side.

§ 448. The teeth with which Fishes are provided, are usually found in the jaw; but sometimes on the tongue, in the palate, and also in the throat. They are used as weapons of attack and defence.

§ 449. Fishes are provided with various means of defence and attack. Some are armed with bristles, as the Sea-porcupine; others with a sting, as the Cat-fish; others again with a sword, as the Sword-fish. Some also are provided with a saw, as the Saw-fish; and others with an electric benumbing power, as the Electric Eel.

§ 450. The frame of Fishes is cartilaginous or bony. The back-bone goes the whole length of the body, and

consists, as in the preceding classes, of vertebræ, of which each species has a determinate number.

§ 451. Most Fishes are provided with a swimming-bladder, which they can fill with air, or contract, in order to facilitate their ascent or descent in the water.

§ 452. This swimming-bladder is a membranous air-vessel of an oval form, situated along the back-bone, and sometimes divided into two or more prolonged lobes, which have a communication with the stomach by a small channel, called the Pneumatic channel.

§ 453. It cannot be doubted, that it is by means of the the swimming-bladder that Fishes effect their ascent or descent in the water; for if we pierce, with a fine needle, the swimming-bladder of a living fish, it descends to the bottom, and is not able to ascend. Where artificial fish-ponds are near together, and each contains a different species of fish, this expedient is sometimes resorted to, in order to prevent them from passing from one pond into another.

§ 454. The eggs of which the fish-roë is composed are very small, and their number in some species is so immense, that if the greater part of them were not the prey of other fishes, the ocean would soon be found too small for its inhabitants. There have been found in one Herring 50,000, in a Carp 200,000, in a Flounder one million, and in a Cod-fish nine millions of eggs.

§ 455. The fish-eggs are hatched in the water by the caloric of the atmosphere. The time required depends upon the species. Some require only seven days, others a longer time, and some fifty days, which is the longest. The embryo is developed in the same manner as that of birds and reptiles.

§ 456. The use of fish as food is universal. Thousands of families are supported by fishing; and in some parts of the world the Shad, Mackerel, and Cod fisheries are a principal branch of industry.

§ 457. The *Ichthyophagi* (fish-eaters) on the shores of the Red Sea in Arabia, the Kamschatkades, and some other people, make a kind of bread, by drying fish in the sun, and converting them into flour.

§ 458. That the Romans and Greeks were great lovers of fish, is shown by many facts. For instance, in Athens a fine horse was given for a peculiar kind of fish ; and in Rome, often much more. The wealthy family Licinia was honored by the name of *Muræna*, (Eel,) and the celebrated epicure Sergius with that of *Orata*, (Gold-fish,) on account of their love of fish. The dinner-table of the Roman emperor Theodoric the Great, (in the sixth century,) was daily covered with a great variety of costly fish.

§ 459. As the systematic classification of fishes appears to stand in need of much improvement, we make use here of the system of Linnæus, the most comprehensive for beginners ; he divided Fishes into the six following Orders, viz. :

1st Order.—Cartilaginous Fishes with open gills : (Chondropterygii.)

2d Order.—Cartilaginous Fishes with covered gills : (Branchiostegi.)

3d Order.—Apodal Fishes, (Apodes :) without ventral fins.

4th Order.—Jugular Fishes, (Jugulares :) having the ventral in front of the pectoral fins.

5th Order.—Thoracic Fishes, (Thoracici :) having the ventral immediately below the pectoral fins.

6th Order.—Abdominal Fishes, (Abdominales :) having the ventral behind the pectoral fins.

1st Order.—CARTILAGINOUS FISHES WITH OPEN GILLS.

Fig. 25.



THE HAMMER-HEADED SHARK.—(*Squalus Zygaena*.)

2d Order.—CARTILAGINOUS FISHES WITH COVERED GILLS.

Fig. 26.



THE COMMON STURGEON.—(*Accipenser Sturio.*)

3d Order.—APODAL FISHES.

Fig. 27.



THE SWORD-FISH.—(*Xyphias Gladius.*)

4th Order.—JUGULAR FISHES.

Fig. 28.



THE COMMON WEAVER.—(*Trachinus Draco.*)

5th Order.—THORACIC FISHES.

Fig. 29.

THE MACKEREL.—(*Scomber Scomber.*)

6th Order.—ABDOMINAL FISHES.

Fig. 30.

THE FLYING-FISH.—(*Exocetus volitans.*)

QUESTIONS ON SECT. XXV.

- § 443. What is Ichthyology?
 § 444. Describe Fishes.
 § 445. Of what do fins consist, and what are their names?
 § 446. Describe them.
 § 447. What organs are called gills?
 § 448. Of what use are teeth to fishes, and where are they found?
 § 449. How are many fishes armed?
 § 450. What do you know of their frame?
 § 451. How do they facilitate their swimming?
 § 452. Describe the swimming-bladder.
 § 453. What do fishes effect by it? What experiments are related?
 § 454. What do you know of fish-eggs?
 § 455. What do you know of their hatching?
 § 456. Of what use are fishes?
 § 457. What people make a kind of bread of them?
 § 458. What can you say of the Romans and Greeks with respect to fishes?
 § 459. Into how many Orders may fishes be divided? Name them.

SECTION XXVI.

1st Order—CARTILAGINOUS FISHES WITH OPEN GILLS :
(*Chondropterygii.*)

§ 460. To the first Order of Fishes belong those cartilaginous fishes, the gills of which lie open, and are not covered with a membrane, (operculum;) as, for instance, the Ray, Shark, etc.

§ 461. Cartilaginous fishes, destitute of a gill-membrane, and having a flat, broad, thin body, and a mouth situated quite below, are called Ray.

§ 462. There are different species of Ray; of which some attain the length of only two or three feet, while others are fifteen or more feet in length, and weigh from 200 to 500 pounds. The flesh of the smaller ones is a wholesome and very palatable food.

§ 463. The eggs of the Ray are often seen floating near the shores of the sea, and are called purses by fishermen, from their form, which is that of a four-cornered bag, and of a black color.

§ 464. The Ray is an inhabitant of deep seas, is found in all the climates of the world, and lives on crabs, snails, fish, and any other animals that come in its way. The large ones are dangerous to man.

§ 465. The most remarkable Ray is the *Torpedo*, or Cramp-fish, (*Raja Torpedo*,) and on account of its benumbing or stupifying power, it is also one of the most interesting species. It weighs, when full-grown, about fifty pounds, and is found in every sea.

§ 466. As the *Torpedo* has no arms, and no considerable strength for attacking or repelling attack, nature has provided it with the means of giving an electric shock to its assailants or its prey, by which they are benumbed, and even killed.

§ 467. The electric power of the *Torpedo* is situated under its skin, between the pectoral fins, the head, and the gills, on which are seen a great number of small mem-

branous tubes, united like the cells of a honey-comb, which are filled with a slimy substance, and through which pass numerous nerves.

§ 468. These tubes are mostly six or five sided, some of them square: 1,200 have been found on one side of a Torpedo, or 2,400 on both sides: they may be compared to charged electric jars, or to an electrical battery, for they are charged with the electric fluid.

§ 469. The nature of this curious phenomenon was for a long time unknown. It was discovered by confining a duck in a vessel with a Torpedo; and as the bird, after a few hours, was found dead, the electric power of the fish was ascertained.

§ 470. The *Shark* has a cartilaginous skeleton, gills without cover, two fins on the back, a mouth generally placed far beneath the end of the nose, and the upper part of the tail longer than the lower.

§ 471. The mouth of the Shark is furnished with a six-fold row of flat, triangular, finely serrated and exceedingly sharp teeth, which lie quite flat in the mouth; but which, when seizing its prey, are raised with the aid of muscles, by which they are joined to the jaw.

§ 472. Sharks may be called the tigers of the sea, for they are the most ferocious and dangerous of the finny tribes. They kill and devour every living thing that comes in their way. Their insatiable voracity may be owing to the great quantity of gastric juice with which they are supplied, causing them to digest very rapidly; as well as to the Tape, and other intestinal worms, which are always found in great numbers in their intestines.

§ 473. In order to discover their victims at a distance, Sharks are provided with a powerful sense of smell; hence at sea they are frequently seen swimming behind vessels, for the purpose of devouring what may drop or be thrown overboard.

§ 474. There is no genus of fish which equals the genus Shark in dimensions and weight. We have accounts of White Sharks which measured thirty feet, and weighed more than a thousand pounds. They are found in all the warmer seas.

§ 475. The empty eggs of the Shark are often seen floating near the shores of the sea; they are black, and of a quadrangular form, like a pillow, with four corners; and to each one is attached a long black filament thirty or forty inches long.

§ 476. The flesh of the Shark, being coarse and of a disagreeable flavor, is not eatable. The most useful part of this fish is its liver, on account of its oil; the liver of a Shark about twenty feet long yielding from two to three barrels. The skin of this animal, which is rough, is used for polishing ivory and wood, and for making thongs and other tackle for carriages, and shagreen.

§ 477. The *Saw-fish* (*Squalus Pristis*) is a species of Shark: it received its name from the flat, hard cartilaginous prolongation of its snout, which is covered with a leather-like skin, and set on either side with from 25 to 30 sharp teeth.

§ 478. This saw-like weapon is usually half as long as the body of the fish; but Saw-fish have been seen, the bodies of which were fifteen and the saw ten feet long.

§ 479. The Saw-fish is very bold and courageous; so much so, that it attacks whales, and kills them after a bloody battle. This animal is found in all the seas, but principally near the shores of Africa.

§ 480. The *Hammer-headed Shark* (*Squalus Zygæna*) has its name from the form of its head, which is that of a hammer, the eyes being placed at both extremities of it. It grows to be six feet long, is very voracious, and inhabits all the seas of the world.

QUESTIONS ON SECT. XXVI.

- § 460. What Fishes belong to the first Order?
- § 461. What fish do you call Ray?
- § 462. Of what length, weight, and use is the Ray?
- § 463. What do you know of the eggs of the Ray?
- § 464. Where is the Ray found, on what does it feed, and what is its disposition?
- § 465. Why is the Torpedo the most interesting species of the Ray? What is its weight, and where is it found?
- § 466. What is the weapon of the Torpedo?
- § 467. Where is the electric power of the Torpedo situated, and what is seen there?
- § 468. What are the form and number of the electric tubes of the Torpedo, and to what may they be compared?

- § 469. How was the electric power of the Torpedo ascertained?
 § 470. What is the external character of the Shark?
 § 471. What do you know of the teeth of the Shark?
 § 472. Why may Sharks be called the Tigers of the sea, and what is the cause of their insatiable voracity?
 § 473. What do you know of the sense of smell in Sharks?
 § 474. What is the size and weight of the Shark; and where is it found?
 § 475. What do you know of the eggs of Sharks?
 § 476. What use is made of Sharks?
 § 477. Why is the Saw-fish so called? Describe its saw.
 § 478. What is the length of a Saw-fish and its saw?
 § 479. What is said of the courage of the Saw-fish? Where is this fish found?
 § 480. What do you know of the Hammer-headed Shark?

SECTION XXVII.

2d Order—CARTILAGINOUS FISHES with covered gills: (*Branchiostegi.*)

§ 481. Those cartilaginous fishes, the gills of which are covered with a membrane, belong to this Order; as, for instance, the Sturgeon.

§ 482. The *Sturgeon* (*Accipenser*) has a cartilaginous skeleton, covered with gills, and a mouth, like that of the Shark, placed far below, but without teeth.

§ 483. Sturgeons are very large, some of them being more than twenty-five feet long; but they are defenceless. They feed on herring, mackerel, worms, and water-insects, and are found in all the seas of the world.

§ 484. The Sturgeon, towards spring, ascends the rivers to deposit its roe, which is remarkable for its quantity and the number of its eggs; one hundred and fifty millions having been found in a single roe.

§ 485. These eggs are a considerable article of commerce with many people, but principally with the Cossacks of the Don and the Black Sea, who salt and press them, and export them in large cakes, like cheese; in which form they are known by the name of Caviar in all parts of the world, and esteemed as an excellent article of food.

§ 486. The flesh of the Sturgeon is another considerable article of commerce. It is smoked or broiled in slices, and pickled, and in this form exported. It is fat, and so palatable, that it was considered by the ancient Romans as one of the most sumptuous dishes; and at all great dinner-parties this fish was always carried by servants, crowned with garlands and flowers, and accompanied by a band of musicians.

§ 487. The swimming-bladder of the Sturgeon is also turned to a profitable use: cut open and washed, and its silvery glutinous skin exposed to the sun for some hours, and separated from the external skin, which is of no use, it furnishes the valuable and extensive article of commerce, known by the name of Isinglass.

§ 488. Hundreds of thousands of Sturgeons could be taken every year in the rivers of the United States. James river, the Potomac, the Delaware, and especially the Kennebec, as well as the larger rivers of all the Eastern and Northern States, (which they ascend from 300 to 500 miles,) abound with them.

§ 489. The principal species of the Sturgeon are: The *Common Sturgeon* (*Accipenser Sturio*) of the European seas and rivers; The *Sterlet* (*Accipenser Ruthenus*) of the Mediterranean, Black, and Caspian seas; The *Lake Sturgeon*, (*Accipenser rubicundus*), of a yellowish-red on the back, olivaceous-red on the sides, found in Lakes Ontario and Erie, and the upper lakes; The *Short-nosed Sturgeon*, (*Accipenser brevirostris*), found in all the rivers of the United States; and The *Sharp-nosed Sturgeon*, (*Accipenser oxyrhincus*), found also in all the rivers of the United States.

QUESTIONS ON SECT. XXVII.

§ 481. What fishes belong to the second Order?

§ 482. What is the external character of the Sturgeon?

§ 483. What do you know of the size and food of the Sturgeon; and where is it found?

§ 484. When and why does the Sturgeon ascend the rivers, and what number of eggs does it produce?

§ 485. What use is made of the eggs of the Sturgeon?

§ 486. What use is made of the flesh of the Sturgeon, and in what esteem was it among the ancient Romans?

§ 487. What use is made of the swimming-bladder? How is isinglass prepared?

§ 488. What rivers of the United States abound with Sturgeon?

§ 489. What are the principal species of Sturgeons?

SECTION XXVIII.

3d Order—APODAL FISHES: (*Apodes*.)*

§ 490. *Apodal Fishes* are those which have a bony and not cartilaginous skeleton, and are destitute of ventral fins; as the Eel, the Sword-fish, and many others.

§ 491. All those fishes which have a long, slender, and slippery body, no ventral fins, and the caudal fin united with the anal and dorsal fin, are called *Eels*.

§ 492. Eels are found in all the seas of the world, as well as in the mouths of rivers, and attain a length of ten feet and more. They are in some countries an important article of food; and also of commerce, when broiled and pickled.

§ 493. The most singular of this species of fish is the *Electric Eel*, (*Gymnotus electricus*), which is from five to six feet long, of a dark color, and possesses, like the Torpedo, a truly electric power, by which it paralyzes whatever living thing comes in contact with it. This fish is found principally in the ponds and rivers of Surinam and Cayenne.

§ 494. The *Sword-fish*, (*Xyphias Gladius*), when full grown, is from twenty to thirty feet long, without scales, of a bluish-black color above, and a silvery color on the sides, and having the upper jaw terminated by a sword-shaped snout. It is found in the Mediterranean, as well as in the Atlantic Ocean, in Africa and America.

§ 495. The *Sword-fish* is mostly herbivorous, feeding principally on sea-grass. Its flesh is much esteemed, and is often found in the markets of New York.

* *Apodes* is a Greek word, signifying *without feet*; here indicating the absence of the ventral fins.

QUESTIONS ON SECT. XXVIII.

- § 490. What are Apodal Fishes?
 § 491. What fishes are called Eels?
 § 492. Where are Eels chiefly found, and what is their size and use?
 § 493. What is the size, color, and form of the Electric Eel, and where is it found?
 § 494. What is the size, color, and form of the Sword-fish, and where is it found?
 § 495. On what does the Sword-fish feed, and what use is made of it?
-

SECTION XXIX.

4th Order—JUGULAR FISHES: (*Jugulares.*)

§ 496. *Jugular Fishes* are those which have the ventral in front of the pectoral fins; as the Cod-fish, and several others.

§ 497. The *Cod-fish*, (*Gadus Morrhua*.) when full grown, is five feet long, weighs seventy pounds, is ash-colored above, commonly spotted with yellow, white beneath, and has more than one dorsal and anal fin. It is found in the northern part of the world, between the 40th and 66th degree of latitude.

§ 498. The Cod-fish is such an extensive article of commerce, that the Cod-fisheries, carried on principally on the banks of Newfoundland by several nations, have been the occasion of many improvements in navigation and commerce.

§ 499. The Cod-fish is found in astonishing numbers on the banks of Newfoundland, whither it is attracted by the great numbers of worms, crabs, and shellfish, produced in those sandy bottoms; here also they are in the vicinity of the polar seas, whither they return towards winter to deposit their roe.

§ 500. Much use is made of the Cod-fish. The head is sometimes eaten fresh on the spot where the fish is caught; or it is dried, and used as food for cows, as in Norway. From the livers are produced great quantities

of oil, superior to that of the whale. The roe is salted, and exported under the name of Caviar; while the body of the fish, preserved in different ways, furnishes a valuable article of commerce.

§ 501. The number of Cod-fish caught during the summer on the banks of Newfoundland, amount to more than four hundred millions; and the number of sailors occupied in the business of fishing, is about twenty thousand.

QUESTIONS ON SECT. XXIX.

496. What are Jugular Fishes?

497. What is the size, weight, color, and form of the Cod-fish, and where is it found?

498. What advantage have the Cod-fisheries been to navigation and commerce?

499. Why is the Cod-fish found in such astonishing numbers on the Banks of Newfoundland?

500. What use is made of the head, liver, body, and roe of the Cod-fish?

501. What is the number of Cod-fish caught on the banks of Newfoundland, and what the number of sailors occupied in fishing?



SECTION XXX.

5th Order—THORACIC FISHES: (*Thoracici*.)

§ 502. To this Order belong those Fishes which have the ventral immediately below the pectoral fins; as the Flounder, Perch, Pilot-fish, and Mackerel.

§ 503. The *Flounder* has a flat and very thin body, colored on the upper and white on the under side, with both eyes on the same side of the head. It inhabits the deep seas in the northern parts of the globe.

§ 504. Flounders not furnished with a swimming-bladder keep near the bottom of the sea, where they feed on small fish, snails, and star-fish. They are much esteemed on account of their tender, white, and palatable flesh.

§ 505. The *Halibut* (*Pleuronectes Hippoglossus*) is one of the largest species of Flounders, weighing sometimes four hundred pounds. It is found in the northern seas of America and Europe.

§ 506. The *Pilot-fish* (*Gasterosteus Ductor*) is one foot long, of a blue color, with four or five broad dark bands around the body, and is found in all the warmer seas.

§ 507. This celebrated little fish is always found accompanying or preceding the White Shark, either for the purpose of directing him to his prey, or perhaps for its own safety. The intimacy of this little fish with the most voracious tenant of the sea, would be incredible, if it had not been observed by the most distinguished naturalists.

§ 508. The *Spring Mackerel* (*Scomber Scomber*) has a compressed smooth head, two dorsal fins, or only one, but with several spurious fins towards the tail. Its color above is a steel-blue, becoming lighter on the sides, mixed with metallic green. It is found in the Atlantic Ocean, and in the Mediterranean and Adriatic seas.

§ 509. The Mackerel-fishery of the United States is a source of great profit; the number of barrels inspected in 1848, was 300,130, equal in value to about two millions of dollars.

§ 510. The Mackerel was greatly esteemed by the ancient Romans, who made of them a kind of pickle, which they called *Garum*, and which they used as a costly ingredient in their sauces, as well as a delightful beverage: the best was made by a certain company in Carthage. The Greeks called it *Tarichos*.

QUESTIONS ON SECT. XXX.

502. What fishes are called Thoracic?

503. What is the external character of the Flounder, and where does it resort?

504. Why do Flounders keep near the bottom, and of what use are they?

505. What is the weight of the Halibut, and where is it found?

506. What is the size and color of the Pilot-fish, and where is it found?

507. In what company is the Pilot-fish always found, and for what purpose?

508. What is the external character of the Spring Mackerel, and where is it found?

509. What is the number and value of the Mackerel taken in 1848?

510. How was the Mackerel esteemed by the ancient Romans?

SECTION XXXI.

6th Order—ABDOMINAL FISHES: (*Abdominales*.)

§ 511. To this Order belong all those fish which have the ventral behind the pectoral fins; as the Cat-fish, Salmon, Trout, Pike, Herring, Shad, common Flying-fish, Carp, and several others.

§ 512. The *Salmon* (*Salmo Salar*) is sometimes two feet long; bluish-black, tinged with gray above, silvery white beneath, and with dark spots distributed over the body. It is found in the northern seas of America and Europe, and ascends the rivers in summer.

§ 513. The flesh of the Salmon is eaten fresh, as well as smoked. The women of the Tunguses, in Siberia, have the art of tanning its skin in such a way as to be flexible, for the purpose of clothing.

§ 514. The *Herring* (*Clupea Harengus*) is a very important fish in North America, and especially in the northern parts of Europe. Its great and regular migrations during the summer along the coasts have given employment to many thousand people. It is a valuable article of commerce, pickled or smoked, and is sometimes used also as manure.

§ 515. The *American Shad* (*Alosa præstabilis*) is one foot or more in length, has a dark bluish head and back, and greenish sides. It is found in the beginning of spring in the rivers of North America, whither it comes from the southern seas to deposit its spawn. They descend at the end of May.

§ 516. The Shad is a favorite dish in the months of March and April, and many towns of the Union carry

on a considerable commerce in the exportation of pickled Shad.

§ 517. The *Gold-fish* (*Cyprinus auratus*) is generally five inches long, silver-colored, red, black, or variegated, and is found in the seas of Japan and China, but is now kept everywhere as an ornament.

§ 518. This beautiful fish was first introduced into England by Philip Worth, in 1728. It may be kept in vessels or ponds, and fed with bread, the yolks of eggs boiled hard, dried fresh pork, snails, and worms.

§ 519. In order to raise Gold-fish from the egg, the spawn, which is seen floating on the water, should be collected and secured in a separate vessel as soon as deposited, to prevent its being eaten by the fish.

QUESTIONS ON SECT. XXXI.

511. What fishes belong to the Order of Abdominal Fishes?
512. What is the size and color of the Salmon, and where is it found?
513. What use is made of the Salmon?
514. Of what importance is the Herring?
515. What is the size and color of the American Shad?
516. Of what use is the American Shad?
517. What is the size and color of the Gold-fish, and where is it found?
518. By whom and when was the Gold-fish introduced into England, and on what may it be fed?
519. What is it necessary to do, in order to raise Gold-fish?

LIST OF FISHES FOUND IN THE STATE OF NEW YORK, AND DESCRIBED BY DOCTOR JAMES E. DE KAY IN HIS ZOOLOGY OF NEW YORK.

1st Order: CARTILAGINOUS FISHES WITH OPEN GILLS.

- | | |
|------------------------------|-----------------------|
| 1. The American Sea-lamprey. | 7. The Prickly Ray. |
| 2. " Bluish Sea-lamprey. | 8. " Spotted Ray. |
| 3. " Small Sea-lamprey. | 9. " Broad-sting Ray. |
| 4. " Colored Mud-lamprey. | 10. " Cow-nosed Ray. |
| 5. " Plain Mud-lamprey. | 11. " Hedge-hog Ray. |
| 6. " Clear-nosed Ray. | 12. " Whip-sting Ray. |

- | | |
|------------------------------|---------------------------------|
| 13. The Smooth Skate. | 27. The American Angler. |
| 14. " Thresher Shark. | 28. " Gibbon's Mouse-fish. |
| 15. " Small Blue Shark. | 29. " Smooth Mouse-fish. |
| 16. " Dusky Shark. | 30. " Short-nosed Malthea. |
| 17. " Ground Shark. | 31. " Dotted Malthea. |
| 18. " Green-backed Shark. | 32. " Bat Malthea. |
| 19. " Long-tailed Porbeagle. | 33. " Common Toad-fish. |
| 20. " American Hound-fish. | 34. " Two-spined Toad-fish. |
| 21. " Basking Shark. | 35. " Orange File-fish. |
| 22. " Spinous Dog-fish. | 36. " Long-finned File-fish. |
| 23. " Nurse. | 37. " Massachusetts File-fish. |
| 24. " Hammer-head Shark. | 38. " Thread File-fish. |
| 25. " American Angel-fish. | 39. " Long-tailed Unicorn-fish. |
| 26. " Common Saw-fish. | 40. " Dusky Balistes. |

2d Order : CARTILAGINOUS FISHES WITH COVERED GILLS.

- | | |
|-----------------------------|-------------------------------|
| 41. The Lake Sturgeon. | 48. The Lineated Puffer. |
| 42. " Short-nosed Sturgeon. | 49. " Small Globe-fish. |
| 43. " Sharp-nosed Sturgeon. | 50. " Short Head-fish. |
| 44. " Dromedary Trunk-fish. | 51. " Lump-fish. |
| 45. " Yale's Trunk-fish. | 52. " Banded Pipe-fish. |
| 46. " Common Puffer. | 53. " Green Pipe-fish. |
| 47. " Curved Puffer. | 54. " Hudson River Sea-horse. |

3d Order : APODAL FISHES.

- | | |
|------------------------------|----------------------------------|
| 55. The Common New York Eel. | 61. The Banded Sand-lance. |
| 56. " Beaked Eel. | 62. " Silvery Hair-tail. |
| 57. " Bullhead Eel. | 63. " Sea-wolf. |
| 58. " American Conger. | 64. " Long-finned Harvest-fish. |
| 59. " New York Ophidium. | 65. " Short-finned Harvest-fish. |
| 60. " American Sand-lance. | 66. " Common Sword-fish. |

4th Order : JUGULAR FISHES.

- | | |
|-----------------------------|------------------------------|
| 67. The Unarmed Uranoscope. | 76. The New York Pollack. |
| 68. " American Cod. | 77. " Coal-fish. |
| 69. " Power-cod. | 78. " Green Pollack. |
| 70. " Tom-cod. | 79. " Cusk. |
| 71. " Haddock. | 80. " American Codling. |
| 72. " American Hake. | 81. " Spotted Codling. |
| 73. " Plain Burbot. | 82. " Thick-lipped Eel-pout. |
| 74. " Spotted Burbot. | 83. " Bordered Eel-pout. |
| 75. " Compressed Burbot. | |

5th Order : THORACIC FISHES.

- | | |
|-------------------------------|-------------------------------|
| 84. The White-headed Remora. | 92. The Variegated Goby. |
| 85. " Indian Remora. | 93. " Small Sea-Scorpion. |
| 86. " Common Remora. | 94. " Spotted Sea-Scorpion. |
| 87. " Bottle-headed Dolphin. | 95. " Hair-finned Belepharis. |
| 88. " Common Bullhead. | 96. " Rostrated Argyreiose. |
| 89. " Brazen Bullhead. | 97. " Hair-finned Argyreiose. |
| 90. " Smooth-browed Bullhead. | 98. " Blunt-nosed Shiner. |
| 91. " Greenland Bullhead. | 99. " Halibut. |

- | | |
|-----------------------------------|----------------------------------|
| 100. The New York Flatfish. | 145. The Black Huron. |
| 101. " Pigmy Flatfish. | 146. " Champlain Pickering. |
| 102. " Rustic Flatfish. | 147. " Yellow Pike Perch. |
| 103. " Toothed Flatfish. | 148. " Gray Pike Perch. |
| 104. " Oblong Flounder. | 149. " Tesselated Darter. |
| 105. " Long-toothed Flounder. | 150. " Croper. |
| 106. " Spotted Turbot. | 151. " Black Sea-bass. |
| 107. " New York Sole. | 152. " Crowler. |
| 108. " Banded Ehippus. | 153. " Fresh-water Bass. |
| 109. " Moon-fish. | 154. " Black Fresh-water Bass. |
| 110. " Razor-fish. | 155. " Obscure Fresh-water Bass. |
| 111. " Sheep's-head. | 156. " Common Pond-fish. |
| 112. " Sand Porgee. | 157. " Black-eared Pond-fish. |
| 113. " Rhomboidal Porgee. | 158. " Coachman. |
| 114. " Aculeated Gilt-head. | 159. " Spineless Perch. |
| 115. " Big Porgee. | 160. " Northern Barracuta. |
| 116. " Common Bergall. | 161. " Cirrous Lepisoma. |
| 117. " Spotted Bergall. | 162. " New York Pilot-fish. |
| 118. " New York Tautog. | 163. " Spring Mackerel. |
| 119. " Lafayette. | 164. " Fall Mackerel. |
| 120. " Weakfish. | 165. " Spanish Mackerel. |
| 121. " Lake Sheep's-head. | 166. " Common Tunny. |
| 122. " Silvery Corvina. | 167. " Striped Bonito. |
| 123. " Branded Corvina. | 168. " Spotted Cybium. |
| 124. " Malashganay. | 169. " Northern Crab-eater. |
| 125. " Sharp-finned Corvina. | 170. " Carolina Lichia. |
| 126. " Kingfish. | 171. " Silvery Trachinote. |
| 127. " Big Drum. | 172. " Spinous Trachinote. |
| 128. " Banded Drum. | 173. " Black Pilot. |
| 129. " Banded Corvina. | 174. " Southern Caranx. |
| 130. " Speckled Red-mouth. | 175. " Spotted Caranx. |
| 131. " Yellow-finn'd Red-mouth. | 176. " Branded Seriole. |
| 132. " Squirrel-fish. | 177. " Spotted Lampugus. |
| 133. " Banded Pristipoma. | 178. " Golden Mullet. |
| 134. " Black Triple-tail. | 179. " Rock Mullet. |
| 135. " American Yellow Perch. | 180. " Snipe-nosed Mullet. |
| 136. " Rough Yellow Perch. | 181. " Spotted Mullet. |
| 137. " Rough-headed Yellow Perch. | 182. " Striped Mullet. |
| 138. " Sharp-nos'd Yellow Perch. | 183. " White Mullet. |
| 139. " Slender Yellow Perch. | 184. " Red Curnard. |
| 140. " Striped Sea-bass. | 185. " Banded Curnard. |
| 141. " Ruddy Bass. | 186. " Web-fingered Curnard. |
| 142. " Little White Bass. | 187. " Spinous Curnard. |
| 143. " Small Black Bass. | 188. " Sea Swallow. |
| 144. " White Lake Bass. | 189. " American Sea Raven. |

6th Order: ABDOMINAL FISHES.

- | | |
|-----------------------------|-----------------------------|
| 190. The Oceanic Cat-fish. | 197. The Red-bellied Trout. |
| 191. " Milbert's Arius. | 198. " Lake Trout. |
| 192. " Great Lake Cat-fish. | 199. " Mackinaw Salmon. |
| 193. " Common Cat-fish. | 200. " Common Sea Salmon. |
| 194. " Brown Cat-fish. | 201. " American Smelt. |
| 195. " Black Cat-fish. | 202. " Spotted Troutlet. |
| 196. " Brook Trout. | 203. " Argentine. |

204. The White-fish.	237. The Flat-nosed Bony Pike.
205. " Common Shad Salmon.	238. " Common Carp.
206. " Otsego Shad Salmon.	239. " Variegated Bream.
207. " American Pipe-fish.	240. " New York Chubsucker.
208. " Spotted Pipe-fish.	241. " Brilliant Chubsucker.
209. " Muskellunge.	242. " Long-finned Chubsucker.
210. " Common Pickerel.	243. " Gibbous Chubsucker.
211. " Varied Pickerel.	244. " Round-backed Chubsucker.
212. " Federation Pike.	
213. " Banded Gar-fish.	245. " Common Sucker.
214. " Bill-fish.	246. " Oneida Sucker.
215. " New York Flying-fish.	247. " Horned Sucker.
216. " Single-banded Flying-fish.	248. " Pale Sucker.
217. " Double-banded Flying-fish.	249. " Mullet Sucker.
218. " Common American Herring.	250. " Black Sucker.
219. " Striped Herring.	251. " Large-scaled Sucker.
220. " Green Herring.	252. " New York Shiner.
221. " Little Herring.	253. " Black-nosed Dace.
222. " Brit Herring.	254. " Swan-eater.
223. " Satin-striped Herring.	255. " Red-fish.
224. " Blue Herring.	256. " Roach Dace.
225. " American Shad.	257. " Shining Dace.
226. " American Alewife.	258. " Black-headed Dace.
227. " Mossbonker.	259. " Bay Shiner.
228. " Autumnal Herring.	260. " Silvery Dace.
229. " Slender Herring.	261. " Banded Dace.
230. " Spotted Shadine.	262. " Corporaalen.
231. " Spotted Thread-Herring.	263. " Pigmy Dace.
232. " River Moon-eye.	264. " Sheep's-head Lebias.
233. " Lake Moon-eye.	265. " Striped Kill-fish.
234. " Saury.	266. " Big Kill-fish.
235. " Western Mud-fish.	267. " Barred Kill-fish.
236. " Buffalo Bony Pike.	268. " Transparent Minnow.
	269. " Barred Minnow.

AUTHORITIES AND SOURCES FOR THE NATURAL HISTORY OF FISHES.

Th. Pennant's British Zoology.....	1776
Lacepede, Histoire Naturelle des Poissons.....	1798
Annals of the Lyceum of Natural History of New York.....	1824
T. F. Blumenbach's Handbuch der Naturgeschichte.....	1825
Cuvier et Valenciennes. Histoire Naturelle des Poissons.....	1828
Oken's Allgemeine Naturgeschichte für alle Stände.....	1836
James E. De Kay's Zoology of New York.....	1842

SECTION XXXII.

V. ENTOMOLOGY.

§ 520. *Entomology* is the science which treats of Insects. Insects are oviparous, with white cold blood, and provided with at least six horny organs of motion, and two thread-like organs, placed near the eyes, called *Antennæ*, or feelers.

§ 521. Insects derive their name from the circumstance, that the head, breast, and extremity of the body are separated one from the other, as if by an incision; and in many cases only connected by a thread, as in Hornets.

§ 522. Insects are oviparous; that is, they lay eggs, from which proceed individuals, similar to worms, called collectively *Larvæ* or *Caterpillars* in butterflies, *Grubs* in beetles, and *Maggots* in bees, wasps, and flies.

§ 523. The voracity of the larvæ of some insects is astonishing. It is well known that a caterpillar consumes in twenty-four hours more than three times its weight.

§ 524. The larva grows with great rapidity. For example, the maggot of a meat-fly, in twenty-four hours, becomes 155 times heavier than it was at its birth.

§ 525. As soon as the larva comes out from the egg it finds abundant food, adapted to its nature; for insects, under the guidance of their instinct, lay their eggs in the situations best adapted for sustaining their future progeny,—as on the leaves of plants, on putrified bodies, or meat, and even in the bodies of other animals.

§ 526. The larva, after its full growth, is converted into a *Nympha*, (also called *chrysalis* or *cocoon*,) and passes this portion of its life in a state of torpor, without eating or moving, as we see in the cocoons of butterflies; after a shorter or longer time, however, the skin of the nympha bursts, and the perfect insect comes out.

§ 527. Insects do more injury than good. Nevertheless, many of them are serviceable to man. A number of them feed on carrion, and thus purify the air; blister-

beetles are valuable for medical use; lobsters and crabs serve as food; the silk-worm furnishes clothing; the cochineal, dye-stuff; bees give us honey, and from bees-wax, candles are made.

§ 528. The injury done by insects is immense. The larvæ of the snout-beetles (*Curculionites*) dwell in the heart of apples, pears, apricots, hazelnuts, chestnuts, peas, and rice, and destroy them. Another larva, called the white or black corn-worm, devours the young shoots of corn, wheat, barley, rye, cabbages, and turnips; others (*Bostrychus*) destroy entire forests of pine-wood for miles in extent.

§ 529. Very great injury is done by caterpillars, which destroy entire orchards; and still greater by grasshoppers, which, in some countries, appearing in myriads, and devouring every product of the soil, produce famine and pestilence: as in Egypt, Arabia, and in several countries of Asia and the east of Europe.

§ 530. Bugs, cockroaches, flies, and parasites, which infest our dwellings or live upon man and other animals, are disgusting and troublesome; while scorpions, spiders, wasps, and bees are provided with venomous weapons of defence.

§ 531. Insects, according to the ingenious arrangement of Linnæus, are divided into seven Orders, viz.:

1. *Beetles* or *Chafers*, (*Coleoptera*.) insects with horny bodies, and two horny wing-covers; as the Tumble-beetle.
2. *Bugs*, (*Hemiptera*.) insects with four wings, folded together, and of about the hardness of parchment; as Bugs, Locusts, Grasshoppers, and Cockroaches.
3. *Butterflies*, (*Lepidoptera*.) insects with four expanded wings covered with colored scales.
4. *Net-winged* Insects, (*Neuroptera*.) those which have four transparent, net-woven, or lattice-like wings; as the Dragon-fly.
5. *Vein-winged* Insects, (*Hymenoptera*.) those which have four transparent veined-wings; as Wasps and Bees.

6. *Two-winged* Insects, (Diptera,) those which have two wings ; as Flies.
 7. *Wingless* Insects, (Aptera,) those which have no wings ; as Scorpions, Lobsters, Crabs, Spiders, Fleas, and all Parasites which live upon animal bodies.
-

REMARKS.—I. No class of animals have attracted more attention, than that of Insects. An immense number of elegant works, embellished with costly engravings, have been published in different countries on the subject of entomology. Governments, Universities, and Societies of Natural History have established large entomological cabinets, in which the Insects of the different parts of the world are preserved and systematically arranged. Many of the most distinguished philosophers seek them in fields and meadows, to examine their organization and ascertain their nature ; they place them in elegant cases, where they are displayed like paintings ; they even raise them in rooms, in order to lose nothing of the splendor of their dresses. This delightful occupation, far from being a trifling amusement, is a useful study ; at the same time that it is one of the purest, most instructive, and healthful amusements. In its pursuit was discovered the use of the Blister-beetles ; of different species of Bees ; of several Butterflies, which produce silk or other stuffs ; and of some other insects producing precious coloring substances, as well as those from which we obtain the finest varnish.

II. As regards the collecting of Insects, it will not be amiss to mention, that the collector of Beetles, Bugs, and Wingless Insects must be provided during his excursions with a wide-mouthed vial, containing a small quantity of whisky, in which to secure them. After having returned home, he must, to preserve them, run a long pin or needle through the right wing and body, and then place them in a box, the bottom of which should be covered with a coat

of beeswax, or cork. The box should be anointed with spirits of turpentine, to prevent the entrance of destructive living insects.

III. Butterflies, and all other winged Insects, are to be taken by the aid of a net, or Butterfly-scissors, made expressly for the purpose, and immediately stuck upon pins. Great care is to be taken that no part of the body be injured.

IV. The most beautiful Butterflies of the different species can be obtained, by collecting, in the months of March and April, or in autumn, their cocoons, (which are found fastened on walls, in crevices, and on fences and branches of trees,) and putting them in a temperate room in open boxes; the greater part of them will thus be converted into butterflies.

V. Butterflies can also be obtained from the caterpillars, by keeping them in open boxes, and feeding them regularly with the leaves of the plants upon which we have found them. We can in this manner observe the whole process of the metamorphosis of the caterpillar into a cocoon, and of the cocoon into a perfect butterfly.

1st Order.—BEETLES.

Fig. 31.



THE DIAMOND-BEETLE.—(*Entimus imperialis*.)

2d Order.—BUGS.

Fig. 32.

THE HOUSE-CRICKET.—(*Acheta domestica*.)

3d Order.—BUTTERFLIES.

Fig. 33.

THE DEATH'S HEAD HAWK-MOTH.—(*Sphinx Atropos*.)

4th Order.—NET-WINGED INSECTS.

Fig. 34.



THE DRAGON-FLY.—(*Libellula*.)

5th Order.—VEIN-WINGED INSECTS.

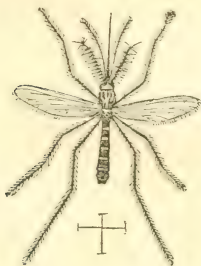
Fig. 35.



THE SAND-WASP.—(*Amophila arenaria*.)

6th Order.—TWO-WINGED INSECTS.

Fig. 36.

THE MUSQUITO.—(*Culex Musquito.*)

7th Order.—WINGLESS INSECTS.

Fig. 37.

THE SCORPION.—(*Scorpio Afer.*)

QUESTIONS ON SECT. XXXII.

520. What is Entomology, and what animals are called Insects?
521. From whence do Insects derive their name?
522. What is a Larva, a Caterpillar, a Grub, and a Maggot?
523. What do you know of the voracity of Larvæ?
524. What do you know of the growth of Larvæ?
525. How do the Larvæ find out their food immediately after coming out from the egg?

526. Into what is the Larva converted after its full growth, what is it called, and what becomes of it?

527. Of what benefit are Insects to man?

528. In what consists the injuries done by Snout-beetles and Corn-worms?

529. What injuries are done by Caterpillars and Grasshoppers?

530. What Insects are disgusting and troublesome, and what others are also venomous?

531. Into how many Orders are Insects divided? Name them.

SECTION XXXIII.

1st Order—BEETLES: (*Coleoptera*.)

§ 532. *Beetles* are Insects with horny bodies, and two horny wing-coverings. The Larva has nippers, and the greater part of them six legs, attached to the thorax: in some, (as the Maggot or Larva of the Snout-beetle,) it is without feet. It generally becomes a chrysalis underground.—Among the Beetles, the following may be mentioned.

§ 533. The *Tiger-beetle* (*Cicindela*) has flat wing-covers, a small cylindrical neck, and a thick head, with large round eyes.

§ 534. Some of the species of the genus* *Tiger-beetle* are metallic green, spotted, or purple, sometimes variegated; and are generally seen on the road or in sandy places, running very fast, or making short flights, like flies.

§ 535. They are called *Tiger-beetles* on account of their carnivorous disposition. They seize other insects with their strong jaws and devour them; and while in the Larva state, they bury themselves in the sand, to ensnare other Insects.

§ 536. The *Caterpillar-hunter* (*Calosoma*) is a very handsome beetle, nearly an inch in length, of a copper-brown or dark-green color; feet and antennæ black. This whole genus may, with propriety, be called *Cater-*

* Aggregate of all the different species.

pillar-hunters. from the fact that they are seen in the morning and evening upon the branches of trees, usefully employed in devouring caterpillars.

‡ 537. The *Bombardier-beetle*, (*Brachinus*.) The different species of this genus are small, of a reddish-brown color above, black below, with bluish-black wing-covers. They are found under stones, and get their name from the manner in which they defend themselves—namely, by ejecting a bluish vapor with a tolerably loud report.

‡ 538. The *Water-beetles* (*Dyticus*) are of a yellowish-brown color. Some species are as small as a flea, and others an inch and a half in length. All of them live in the water, and feed on other insects.

‡ 539. When this Beetle is about to lay its eggs, it prepares a neat oblong husk or shell, which it covers with a brown silk. This nest floats like a boat on the water, with the eggs enclosed, until such time as the young larvæ are hatched, and able to leap overboard into their native element.

‡ 540. The *Whirling Water-beetle* (*Gyrinus*) is frequently seen in ponds, swimming with surprising rapidity in larger or smaller circles, in company with others. They are of a flat, oval form, of a dark shining lead-color, and not much larger than a fly.

‡ 541. The small cylindrical, yellowish-white eggs of the Whirling Water-beetle are fastened on the leaves of water-plants in four or five rows, twenty together: from which, after two or three weeks, proceed long and transparent larvæ, similar in appearance to Centipedes.

‡ 542. The Whirling Water-beetle is distinguished by having four eyes, viz. two above and two beneath the head: as well as a bladder of air behind, for the purpose of descending and ascending in the water.

‡ 543. The *Rover-beetle*, (*Staphylinus*.) like all its kindred species, has a soft, flexible body, a large head with crossing jaws, and very short wing-covers, not extending over more than one-third of the hind-part of the body, although its wings are very large.

‡ 544. The size of the Rover-beetle is as various as the species; some being three-quarters of an inch long,

and others not larger than a flea. They are mostly, however, of a brown or black color.

§ 545. They are generally found in the neighborhood of putrid matter, in dunghills, carrion, mushrooms, and under stones and the bark of trees. They feed only on putrid matter, and thus, like the Turkey-buzzard, aid in purifying the atmosphere.

§ 546. The *Snapping-beetle*, or *Skipper*, (Elater,) is remarkable for the singular dexterity with which, when lying on its back, it throws itself into the air, and falls on its feet, which are too short for raising itself up. This is effected by a long process attached to the front of the thorax or chest, which, moving in a groove along the body, is forcibly protruded in making a dart upwards.

§ 547. There is a great number of species, differing in size and color. They are found in fields, meadows, and upon trees and shrubs. They fall on the ground, and pretend to be dead, on being approached.

§ 548. Those of America are the largest. Some species of the tropics are phosphoric, and known under the name of *Lightning-bugs*, (Cucujo.)

§ 549. The *Fire-fly* (Lampyris) has an elongated, flat body, soft wing-covers, and phosphoric rings at the extremity of the body. These rings enable Fire-flies to shine, and to find one another during the night, when flying in fields and meadows.

§ 550. The *Carrion-beetle* (Necrophorus) has its name from the dexterity with which it scents, from a distance, the bodies of small animals, as moles and frogs, which it buries with its own eggs under the ground, as food for its future progeny. Six of them will bury a mole a foot deep in less than four hours.

§ 551. The large Carrion-beetle of this country is about one inch long, of a black color, intermixed with red. In two weeks, from its eggs, which are white and of a cylindrical form, proceed larvæ, that in four weeks grow to be an inch and a half long, when they are converted under-ground into a chrysalis, in which condition they remain three weeks.

§ 552. The *Cock-chaffer*, or *May-chaffer*, (Melolontha,)

one of the most common insects, is about an inch long, of a black or dark-red color, and appears in large numbers in the first warm evenings of the month of May, fluttering everywhere among the trees.

§ 553. The May-chafers feed on the leaves and blossoms of fruit-trees, which they sometimes entirely strip, ruining whole orchards. They should therefore be destroyed.

§ 554. The May-chafers are still more injurious while in the larva state, which lasts four years, for during this time they feed on the roots of corn, wheat, barley, rye, and oats.

§ 555. The larva of the May-chaffer, when full-grown, is an inch and a half long, and of a dirty-yellow color. It is found from three to six feet deep in the ground. This may be ascertained if in a field or a garden we dig up such plants as have become yellow; at their roots we will find the larvæ of the May-chaffer.

§ 556. The *Stag-beetle*, (*Lucanus*.) thus named from the similarity of its upper jaws to the horns of a stag, is an inch and a half long, and of a chestnut-color. It is found principally on oak-trees, where it licks the juice of the leaves.

§ 557. The larva of the Stag-beetle is from three to four inches long, of a yellow color, and lives probably six years in the larva state. It is found on oak-trees. The ancient Romans considered this larva, when fried, a great luxury.

§ 558. The *Weevil* or *Snout-beetle*, (*Curculio*.) containing a great number of genera and species, has for the most part a short round body with a solid snout, more or less curved, and is of various lengths.

§ 559. The Weevils are very noxious. Those with very long snouts attack the young fruits of trees, and the others grain and garden-plants, by making an opening in them, and depositing one or more eggs: from these proceed maggots, which live in the fruit, as we see in apples, pears, nuts, peas, and rice.

§ 560. The great multiplication of the Snout-beetles

can be prevented by giving protection to our Warblers, Woodpeckers, and all those birds which destroy them.

§ 561. The *Capricorn-beetle*, (*Cerambyx*,) with its kindred species, has remarkably long antennæ and very strong wing-covers; they, as well as their larvæ, live on the stems of trees, and feed on wood, which they convert into dust.

§ 562. The *Lady-bug*, or *Lady-bird*, (*Coccinella*,) is of a round oval form, red or orange-colored, with black dots. It is of a small size, not larger than a pea.

§ 563. The *Lady-bird* has often been recommended as a remedy for the toothache; and as it feeds, as well as its larvæ, only on plant-lice, so injurious to our vegetables, it may be considered a useful insect.

QUESTIONS ON SECT. XXXIII.

532. What do you know of the larva of Beetles?

533. What do you know of the wing-covers, neck, head, and eyes of Tiger-beetles?

534. What is the color and abode of Tiger-beetles?

535. Why are they called Tiger-beetles?

536. What is the external character of the Caterpillar-hunter, and why is it so called?

537. What is the size, color, and abode of the Bombardier-beetle, and why is it so called?

538. What is the color, size, and abode of the Water-beetle?

539. In what manner does the Water-beetle deposit its eggs?

540. What do you know of the Whirling Water-beetle?

541. What can you say of the eggs and larvæ of the Whirling Water-beetle?

542. By what singularity is the Whirling Water-beetle distinguished?

543. What do you know of the body, head, jaws, and wing-covers of the Rover-beetle?

544. What is the size and color of the Rover-beetle?

545. What is the abode and food of Rover-beetles, and of what use are they?

546. For what is the Snapping-beetle remarkable?

547. Where are Snapping-beetles found, and what do they do when approached?

548. In what country do we find the largest Snapping-beetles, and under what name are some of them known?

549. What is the external character of the Fire-fly?

550. Why is the Carrion-beetle so called, and what do you know about it?

551. Of what size and color is the large Carrion-beetle of this country; and what do you know of its eggs, larva, and chrysalis?

552. What is the size and color of the May-chafar, and when does it appear?

553. On what does the May-chaffer feed, and what injury does it do?

554. When, and how, are the May-chafers still more injurious?

555. What is its size and color, and how can its abode be ascertained?

556. What is the size, color, abode, and food of the Stag-beetle, and why is it so named?

557. What is the size and color of its larva, and what use did the ancient Romans make of it?

558. What is the external character of the Weevil?

559. In what respect are the Weevils very noxious?

560. How can the great multiplication of Weevils be prevented?

561. What is the external character, abode, and food of the Capricorn-beetle?

562. What is the color, size, and form of the Lady-bird?

563. Why may the Lady-bird be considered useful?



SECTION XXXIV.

2d Order—BUGS: (*Hemiptera*.)

§ 564. *Bugs* are those insects which have parchment-like wings, and the larva of which resembles the perfect insect, except in wanting wings; as Cockroaches, Crickets, Grasshoppers, Locusts, etc.

§ 565. The greater part of the Insects of the second Order produce sounds, which they effect by rubbing the hind-legs against the wings, as the Grasshopper; or by rubbing one wing against the other, as the Field and House crickets; or by a drum-like organ, situated low in the inside of the body, as the Locust.

§ 566. The *Cockroach* (*Blatta*) is nearly an inch long, and chestnut-colored. It is now found in almost every part of the world, and dwells principally in mills, bakeries, and kitchens, where it is sometimes seen in immense numbers.

§ 567. The Cockroach attacks food of all kinds, but chiefly bread, and is for that reason very dangerous in vessels at sea. It has sometimes produced extreme distress in long sea-voyages.

§ 568. Cockroaches are of no use to man, but very troublesome and injurious, and every effort is made to ex-

turpate or drive them from dwellings. This may be done by pouring boiling water into their places of retreat; by fumigating the apartment in which they are found with the vapor of sulphur and assafoetida; or by putting sticks, besmeared with a viscous substance, into their holes. But a sure way to prevent their entrance into a house, or to effect their expulsion from one, is to have the boards of the floor made tight, and every crack in the pantry and kitchen corked.

§ 569. The *Crickets*. (*Acheta*), to which genus belong the Field, House, and Mole crickets, are, when full-grown, so quarrelsome, that each individual lives separately.

§ 570. The *Field-cricket* (*Acheta campestris*) is a harmless animal, lives in holes, and sings during the summer, day and night. In some countries the boys keep them in small boxes as an amusement.

§ 571. The *House-cricket* (*Acheta domestica*) lives in the cracks of walls, principally in breweries, on account of the wet grain found there, its favorite food. It may easily be destroyed by putting some Field-crickets in the house, which will devour it.

§ 572. The *Mole-cricket* (*Acheta gryllotalpa*) is so called on account of its fore-feet, which are similar to those of a Mole, and well adapted for digging. On that account it is injurious to gardens, fields, and meadows, where they excavate subterraneous holes, and feed on the roots of plants.

§ 573. The *Grasshopper* (*Grillus*) is found in all the countries of the world. Different species of them, varying in size and color, are everywhere seen; and wherever found they are injurious to vegetation, which they devour by means of their strong jaws, laying bare whole countries.

§ 574. One of the most destructive is the *Wandering Grasshopper*, (*Grillus migratorius*;) the wings included, it is two inches and a half long, and of a grayish-brown color, with black spots. They are a common plague in Africa and Asia.

§ 575. The *Wandering Grasshopper*, mentioned in the Bible as one of the plagues inflicted on the Egyptians,

appears in flocks, like heavy clouds, flying from the east towards the west at a height of five hundred feet. They fall in dense clouds upon the ground, and devour the vegetation with a fearful rapidity, leaving nothing but the naked soil.

§ 576. Whole countries, many hundred miles in extent, have been thus deprived of their substance. Famine, as a necessary consequence, is the result of such a devastation; which is followed by pestilence, caused by the stench of myriads of the dead Grasshoppers.

§ 577. The *Seventeen-years Locust* (*Cicada Septendecim*) is an inch and a half long, has a black body, red eyes, and a short, thick head, with a needle-shaped moveable snout, resting on the breast, for the purpose of sucking dew.

§ 578. The *Seventeen-years Locust* is found in the United States, where it appears, in some years, in incalculable numbers. It is so called because it is generally believed that it appears only every seventeen years. But as they appeared in Maryland and Virginia in the year 1834, and again in 1843, in immense numbers, and as some are found every summer in many places, it would seem that this Locust is not rightly named.

§ 579. This locust is harmless, pleasant on account of its song, and does no injury to plants. Its food consists only of dew, which it sucks with its snout. Its appearance, therefore, need not occasion anxiety or alarm.

§ 580. The Locust is important as a delicious food for our fowls. The ancient Romans kept a kindred species, of the same size, (*Cicada Orni*.) in cages, for the sake of its song, and called it the "Nightingale of the Nymphs," "The Sweet Prophet of the Summer," "The Love of the Muses."

QUESTIONS ON SECT. XXXIV.

564. What do you know of Bugs and their larvæ? Name some.

565. How do Bugs produce sounds?

566. What is the length, color, and abode of the Cockroach?

567. Why and where is the Cockroach dangerous?

568. Why is it desirable to extirpate Cockroaches, and how may it be effected?

569. What are the names of the different Crickets, and why do they live separately?

570. What do you know of the Field-cricket?
 571. Where is the House-cricket found, what is its food, and how can it be destroyed?
 572. What do you know of the Mole-cricket?
 573. What do you know of the size and color of Grasshoppers? What injury do they do, and where are they found?
 574. Which is the most injurious Grasshopper? Describe it.
 575. How does it make its appearance?
 576. What has been the consequence of the devastation of the Wandering Grasshopper?
 577. What is the external structure of the Seventeen-years Locust?
 578. Where and how is the Seventeen-years Locust found, and what can you say of its name?
 579. Why should not the appearance of the Seventeen-years Locust excite anxiety and alarm?
 580. What use can be made of the Seventeen-years Locust, and what did the ancients think of it?



SECTION XXXV.

3d Order—BUTTERFLIES: (*Lepidoptera*.)

§ 581. *Butterflies* are distinguished by having expanded wings, covered with colored scales, and by their hairy bodies.

§ 582. The Caterpillars of Butterflies have jaws; a body extended in twelve segments, with nine airholes (spiracles) on each side for breathing; three pairs of hook-shaped claws on the chest, (thorax;) and commonly five pairs of round fleshy legs on the hind-body, (abdomen.)

§ 583. The Caterpillar changes into a Cocoon, which is generally incapable of motion, and the cocoon, after a certain time, changes into a Butterfly, which has generally long antennæ, three pairs of feet, and a spirally-rolled tongue, for sucking, in the place of jaws.

§ 584. The Day-butterfly is so called from its flying only in the daytime. When sitting, it elevates its four expanded wings with the upper surfaces, which in many instances differ materially in their color from the under ones.

§ 585. The Butterfly that flies in the dusk of evening, slowly and heavily, is called *Hawk-moth*, the Caterpillar of which has generally splendid colors, and a hook-shaped horn at the end of the back; as for example, the Potatoworm.

§ 586. The Butterfly which flies only in the night-time is called a *Moth*. The Caterpillars of Moths are generally hairy. They change into a silky cocoon; of which we have an instance in the Silk-worm.

§ 587. Moths prepare their cocoons from a tenacious fluid, contained in two pouches, placed along the back, beneath the stomach, and which they spin into very fine threads by means of a peculiar tube placed behind the mouth.

QUESTIONS ON SECT. XXXV.

581. By what are Butterflies distinguished?

582. What do you know of the jaws, body, airholes, claws, and legs of the Caterpillar?

583. Into what does the Caterpillar change, into what the cocoon, and what do you know of the antennae, feet, and tongue of the Butterfly?

584. What is a Day-butterfly?

585. What a Hawk-moth?

586. What a Moth?

587. From what, and how, do Moths prepare their cocoons?



SECTION XXXVI.

4th Order—NET-WINGED INSECTS: (*Neuroptera*.)

§ 588. The *Net-winged Insects* are distinguished by having four net-like or trellised wings, which generally glitter with colors of every hue, as the Dragon-fly.

§ 589. The *Dragon-fly* (*Libellula*) is common everywhere, and is seen flying in all directions, for the purpose of catching insects, which they devour by means of their strong jaws. They are also frequently seen near

ponds, whither they come to deposit their eggs in the water.

¶ 590. The larvæ of the different species of the Dragon-fly live in the water more than two years, until they are changed into a perfect insect.

¶ 591. As the Dragon-fly does not injure our vegetables, and feeds, in its perfect as well as larva state, only upon other insects, it may be regarded as useful.

¶ 592. The *Ephemera Fly*, called also May-fly and Day-fly, (*Ephemera*,) is about an inch long; generally has transparent wings, (those of some species being citron-colored,) which, when sitting, it elevates vertically, like a Butterfly.

¶ 593. As many species of the May-fly, principally those with transparent wings, live only one day when in a perfect state, they have been called Day-flies.

¶ 594. But for the shortness of its life, this creature is indemnified by the length of its existence in the larva-state, which lasts from two to three years, in the water, like that of the Dragon-fly.

¶ 595. Millions of Day-flies are sometimes seen in the month of May, flying about the surface of rivers and ponds, for the purpose of depositing their eggs; but immediately after, they place themselves upon walls, trees, fences, or windows, and die.

¶ 596. The most singular fact in regard to the May-fly, and which is observed in no other insect, is that they cast their skin just before they die.

¶ 597. The *Ant-lion* (*Myrmelcon*) is about an inch long, has long drooping wings with dark brown spots, and short club-shaped antennæ.

¶ 598. The larva, or real Ant-lion, is ill-shaped, thick and short, about three-quarters of an inch long, brownish-gray, and is armed with jaws, similar to a forceps.

¶ 599. The Ant-lion digs a funnel-shaped pit in the sand, and, covering itself to the neck, lies in wait for, and destroys the ants and other small insects, which, not perceiving it, slip in over the loose sand.

QUESTIONS ON SECT. XXXVI.

588. By what are the Net-winged Insects distinguished? Name some of them.

589. Where are Dragon-flies seen, and on what do they feed?

590. Where is the abode of its larva, and how long does it dwell there?

591. Why may they be considered useful?

592. Describe the Day-fly.

593. Why was it so called?

594. How is it indemnified for the shortness of its life?

595. Where, when, and in what numbers is it seen?

596. What singular fact is mentioned with regard to it?

597. Describe the Ant-lion.

598. Describe its larva.

599. In what manner does it catch other insects?

SECTION XXXVII.*5th Order*—VEIN-WINGED INSECTS: (*Hymenoptera*.)

‡ 600. The *Vein-winged Insects*, such as Wasps, Bees, Ants, etc., are distinguished by having four membranous wings, with few but strong veins, and by generally being shorter and smaller than the foregoing Orders.

‡ 601. Most of these Insects are armed with a sting, and occasionally with venom, which they infuse into the puncture made by their sting.

‡ 602. Their larvæ are mostly Maggots; that is, they have no feet, as, for instance, those of Bees; but some of them, like Caterpillars, are provided with twenty feet, as the Tenthredo.

‡ 603. The Vein-winged Insects answer several important purposes. Some of them produce honey and wax, as the Bees; others destroy millions of noxious insects, by depositing their eggs in their larvæ; and others aid the productive power of plants, by mixing the flower-dust of blossoms, which, accidentally clinging to their feet, is conveyed from one flower to another.

‡ 604. Oak-balls, and the excrescences on wild-roses,

blackberry-bushes, and many other plants, which look like fruits or flowers, are produced by the sting of the Gall-fly, (Cynips.)

§ 605. Punctures, in which they deposite their eggs, are made by the ovipositor of these insects in the bark of plants and trees. There the larva, when hatched, sucks up the sap as it ascends, and makes an opening, in which the sap accumulates, and forms an excrescence.

§ 606. The *Ovipositor* is a pointed organ of the female, situated at the extremity of the body; by means of which she is able to perforate the skin of the bark or leaf, and to deposite her eggs in the puncture.

§ 607. Among the Vein-winged Insects, which contribute materially to the destruction of Caterpillars, Spiders, etc., is the *Ichneumon*, that lays its eggs in living Caterpillars, which, in consequence, become diseased, and die.

§ 608. *Wasps*, *Hornets*, *Bees*, and *Ants* are remarkable for their social habits, thousands of them living together; as well as for the extremely ingenious nests they construct, by their united efforts, with substances of various kinds: Wasps, for example, with fibres of wood, and Bees with wax.

§ 609. A hive of Bees is composed of a *Queen-Bee*, of *Males*, and of *Working-Bees*.

§ 610. The Queen-Bee is slender in body, has short wings, and can lay nearly 12,000 eggs. The Males, or Drones, have a longer and thicker body, as well as longer wings. The Working-Bees, whose task it is to collect materials, build the comb, and nurse the Maggots, are smaller than either.

§ 611. In about twenty days after the young come to maturity, they form a colony, and leaving the old hive, construct a new one.

§ 612. The pain and swelling produced by the sting of Bees, may be remedied by applying cold water.

§ 613. The food of Bees consists of the juice (nectar) of flowers, extracted principally from the yellow dust of their thread-like organs, called *stamens*, which are found in the centre of the blossom.

§ 614. Bees collect the flower-dust, called *pollen*, and carry it to their hives in a peculiar *fossa* on the hinder thighs.

§ 615. The pollen itself is not a wax-containing substance, for it does not melt on the fire; on the contrary, it is consumed by it. It is, however, converted into honey and wax in the body of the Bee, probably by adding to it another substance, peculiar to this insect, and with which we are unacquainted.

§ 616. Many people kill the Bees of each hive every year with the smoke of brimstone; but experienced bee-raisers prefer to let them live, allowing them, for their sustenance during the winter, half the honey of the hive.

§ 617. *Ants*, like Bees, live together in large societies, composed of winged Males and Females, and of wingless Working Ants.

§ 618. The eggs of Ants are exceedingly small, of a white color, and look like the small grains of pounded sugar. The larva is a Maggot, but is soon converted into a Puppa, (cocoon,) which is white and soft, and is carefully raised by the Working Ants.

§ 619. The food of Ants consists chiefly of fruits, sweet substances, living and dead insects, and also carrion. A frog or a mouse thrown into an anthill, is in the space of twenty-four hours converted by them into a thoroughly cleaned skeleton.

§ 620. The winged Male and Female Ants are seen in the fine evenings of August and September, swarming in the air in the form of columns. Soon after, however, they lose their wings, deposite their eggs, and die, leaving the Working Ants to take care of the eggs during the fall and winter.

§ 621. Ants are found in all parts of the world, but differing in size and color. The *White Ant*, a native of the East Indies, is celebrated for constructing conical habitations of clay, often ten or twelve feet high.

QUESTIONS ON SECT. XXXVII.

600. By what are the Vein-winged Insects distinguished?

601. What do you know of their venom?

602. Describe their larvæ.

603. Of what use are Vein-winged Insects?
 604. How are Oak-balls and other excrescences of plants produced?
 605. How are those punctures made?
 606. Describe the Ovipositor.
 607. What Insects contribute materially to the destruction of Caterpillars, and how?
 608. For what are Wasps, Hornets, Bees, and Ants remarkable?
 609. Of what individuals is a hive of Bees composed?
 610. Describe the Queen Bee, the Drones, and Working Bees.
 611. What do you know of the young of Bees?
 612. Describe their sting.
 613. Of what does the food of Bees consist?
 614. How do Bees collect the pollen?
 615. How do they prepare the honey and wax?
 616. How do experienced Bee-raisers treat their Bees?
 617. Into what social classes are Ants divided?
 618. What do you know of their eggs and metamorphosis?
 619. Of what does their food consist?
 620. At what time are the winged Males and Females seen, and what happens to them?
 621. Where are Ants found, and for what is the White Ant celebrated?

SECTION XXXVIII.

6th Order—TWO-WINGED INSECTS: (*Diptera*.)

§ 622. Among *two-winged Insects* are included all kinds of Flies which are provided with only two wings. Some of them have a hard-pointed sucking-tube; others, an elongated snout, (proboscis,) and others again, simply a mouth.

§ 623. Their larva is a Maggot, of a white color, of the form of a spindle, and is found in water, dung, spoiled meat, cheese, and fruit.

§ 624. The Maggot grows very rapidly, its color changes to brown after a few days, its skin becomes hard, and it is soon converted into a Puppa, (cocoon;) from this, which resembles a barrel in its shape, proceeds the perfect Fly.

§ 625. Many species of Flies look like insects of other orders. Thus the Sheep-fly resembles a Spider, and

some others have the form of Wasps, Bees, Hawk-moths or Bugs.

§ 626. Flies are of no direct use to man; they are the parasites of the Animal Kingdom. They torment man and beast, by sucking their blood; they spoil or destroy our provisions; their larvæ destroy our meadows and grain-fields, as the Hessian-fly; while others make their nests in the skin, brain, or stomach of animals.

§ 627. The *Musquito* (*Culex*) is found in all parts of the world, but differing in size and color, and everywhere they are exceedingly troublesome. It is armed with a proboscis, from which proceeds, as from a scabbard, a very minute, fine sting, with which the insect pierces the skin of its victim, and sucks its blood.

§ 628. The cause of the itching and inflammation produced by this sting, seems to be the saliva, which comes from the proboscis, and enters the skin with the sting.

§ 629. The *Musquito* lays about 300 eggs, in stagnant water; from which, after two days, proceed slender-shaped larvæ, moving in the water with great rapidity, as we can see daily in open rain-casks.

§ 630. After remaining only four weeks in the water, the larvæ are converted into perfect insects. According to this fact, five or six generations of the *Musquitoes* are produced during one summer.

§ 631. The *Hessian-fly*, (*Culex Destructor*.) a species of *Musquito*, was first seen in North America in 1776. It is supposed that it was brought from Europe in a ship-load of wheat, destined for the Hessian soldiers.

§ 632. The *Hessian-fly* is very small; entirely black, even the wings, except at the root, where they are reddish-brown; feet pale, covered with black hair.

§ 633. The female, in the spring, makes the stems of wheat a place of deposite for her eggs, the maggots of which enter the plant and feed on it. The number of these insects is so immense, that they sometimes destroy entire fields of wheat.

§ 634. The *Gad-fly* (*Oestrus*) lays her eggs upon living animals, as Cows, Stags, Sheep, etc., by piercing their skin with its strong and sharp ovipositor.

§ 635. The *Horse-fly* (*Oestrus equi*) lays her eggs in the shoulders and fore-legs, or on the lips of the horse. In the latter case, being licked off and swallowed, they pass into the animal's stomach, where, principally during the spring, they are found in large numbers, firmly attached by a hook at the anterior extremity of their bodies. In size they resemble a Date.

§ 636. The *Meat-fly*, (*Musca vomitoria*), a most disgusting insect, deposits its eggs, of which it lays about 200, on all kinds of fresh meat, which it spoils in a short time; maggots being produced from the eggs in 24 hours.

§ 637. These maggots grow with such rapidity, that in 24 hours they increase their weight 200 times. They are full grown in eight days, when they let themselves fall on the ground, where they are converted into brown barrel-shaped puppæ.

§ 638. The *Cheese-maggots* are eaten by many people, in the belief that they originate from the best substance of the cheese; but that is an error, as these disgusting maggots proceed from the eggs of a small brown Fly, which has very long wings, and is of the size of the common ant.

QUESTIONS ON SECT. XXXVIII.

622. What are two-winged Insects?
623. Describe their larvæ.
624. What do you know of the growth and change of their maggots?
625. What do many species of Flies resemble?
626. What injury is done by Flies?
627. What do you know of the Musquito?
628. What is the cause of the itching and inflammation produced by its sting?
629. What do you know about the eggs of Musquitoes?
630. What is said of the larvæ and of the increase of Musquitoes?
631. When and how was the Hessian-fly brought to America?
632. Describe it.
633. What do you know of its eggs, and the destructive power of their maggots?
634. What do you know of the Gad-fly?
635. What do you know of the Horse-fly?
636. What do you know of the Meat-fly?
637. What do you know of its maggots?
638. What do you know of the Cheese-maggots? Describe the Cheese-fly.

SECTION XXXIX.

7th Order—WINGLESS INSECTS: (*Aptera*.)

¶ 639. Insects without wings differ very much in regard to their size, form, and the number of their feet; and do not undergo a metamorphosis, like the preceding orders, the Flea excepted.

¶ 640. To this Order belong the Louse, Flea, Tick, Spider, Scorpion, Crab, Lobster, Centipede, etc.

¶ 641. The *Louse* (*Pediculus*) is probably one of the most extensively diffused genus of Insects. Most Mammalia and birds have Lice of peculiar kinds; and fishes, and even some insects, are also plagued in the same way.

¶ 642. The *Flea* (*Pulex*) lays about twenty eggs, from which, after six days, proceed very small white maggots, of a serpentine form. These, after fourteen days, are metamorphosed into a puppa; from which, after fourteen days more, proceeds the perfect Flea. It is found on man, the dog, fox, squirrel, hare, and hog.

¶ 643. The *Tick* (*Acarus*) lives in forests upon plants, and fastens itself on passing Mammalia, principally, dogs, horses, sheep, and even on man. It thrusts its fore-feet and proboscis into the skin of the animal to which it attaches itself, in order to suck its blood; but by besmearing them with olive-oil, they quickly fall off.

¶ 644. The *Spider* (*Aranea*) has eight feet, and is armed, like a venomous snake, with two moveable fangs; and through these, which are horny, hollow, and crooked, the venom is injected into the wound it inflicts.

¶ 645. The bite of small Spiders produces only an itching, that of the large ones an unpleasant inflammation; but in spite of all this, people have been known to eat them, with bread, as a delicacy.

¶ 646. Spiders are found throughout the world. The greater part of them weave webs which are deserving of special notice for the regularity of their structure, and

the strength with which they resist the action of wind and weather.

§ 647. Those Spiders which construct webs, are provided, at their posterior extremity, with four or six warts, containing one thousand openings.

§ 648. From these openings descend one thousand threads, that unite and become a single line, which is so fine that one hundred of them are not as thick as a human hair.

§ 649. Spider-webs, like silk, have been manufactured into stockings and gloves. However, the manufacture of silk to any considerable extent, from the webs of Spiders, is impracticable; as, in order to obtain one pound of such silk, the webs of 600,000 Spiders would be required.

§ 650. Spiders feed on living animals, particularly insects. Being quarrelsome and cruel, they attack and kill each other; and on that account they lead, like misanthropes, a solitary life.

§ 651. *Scorpions* (Scorpio) have a considerable resemblance to Crabs in their form and mode of life; for, like them, they have eight feet, two pincers, and a hard crustaceous shell, which they cast yearly.

§ 652. Scorpions are found in the temperate as well as the tropical regions of the globe, living under stones and in damp places, and even in houses.

§ 653. Their food consists of insects, which they seize with one of their pincers, inflicting at the same time a mortal wound with their venomous sting, which is also dangerous to man.

§ 654. *Crabs* (Cancer) are of a slender, square, triangular, or globular form, and generally inhabit the seas and rivers. They breathe by means of gills, which are found on the thighs of the pectoral feet.

§ 655. Crabs have two pincers, eight feet, two jointed antennæ, and are covered with a calcareous shell, which they cast off every year at the end of spring.

§ 656. The power of reproduction in Crabs is astonishing. A foot or a pincer, of which they have been deprived, is reproduced, generally with the new shell, but also at other times. They will of themselves cast off

their claws and legs, if these are bruised or touched with a hot iron.

§ 657. The principal material from which the new shell is hardened, seems to be the two calcareous concretions found in summer at both sides of its stomach, and commonly called Crab's Eyes.

§ 658. Crabs feed on dead bodies, spoiled flesh, and all kinds of worms and insects found in the water. They are a numerous family, including all the different species of Crabs, Lobsters, and Craw-fish.

§ 659. Many small Crabs are very injurious to Fish, upon which they live like parasites, sucking their blood and killing them. The larger ones are useful as an article of food.

§ 660. Crabs and Lobsters are very pleasant food in those months in the names of which the letter *r* does not occur—May, June, July, and August. When boiled they become red; and the tail of the Lobster becomes curved, if the animal was alive when first put into the boiler; but if not, it remains straight.

§ 661. The *Horse-shoe Fish*, found so often on our sea-coasts, is the largest of all insects, reaching the length of four feet. It is found on the northeastern coast of America, particularly in the Straits of Bahama, and also in the East Indies.

§ 662. The body of the Horse-shoe Fish has ten pincer-like feet, is very small, and covered with a round shell, at the posterior extremity of which is attached a sting as long as the body.

§ 663. From the eggs of the Horse-shoe Fish a kind of Caviar, called *bocassan*, is made in the East Indies.

§ 664. The *Centipede* has a crustaceous, cylindrical body, about two inches long, with from ninety to a hundred legs on each side; is of a gray color, lives generally in rich ground, and is injurious to various kinds of vegetables, but principally to cabbage.

QUESTIONS ON SECT. XXXIX.

639. What do you know of insects without wings?

640. What Insects belong to this Order?

641. On what animals are Lice found?

642. On what animals is the Flea found? Describe its metamorphosis.
643. What do you know of Ticks?
644. What do you know of the feet and weapons of Spiders?
645. What is the consequence of their bite?
646. Where are they found, and what is deserving of notice?
647. What can you say of their warts?
648. What of their threads?
649. Why cannot silk be manufactured from Spider-webs?
650. On what do Spiders feed, and why do they lead a solitary life?
651. In what respect do Scorpions resemble Crabs?
652. Where are Scorpions found?
653. On what do they feed, and what do you know of their sting?
654. Describe the Crab.
655. What do you know of their feet, antennæ, and shell?
656. What can you say of their reproductive power?
657. What is the principal material from which their new shell is hardened?
658. On what do they feed, and what insects are classed with them?
659. In what respect are they injurious or useful?
660. In what months are Crabs and Lobsters good to eat?
661. What is the size of the Horse-shoe Fish, and where is it found?
662. Describe it.
663. What use is made of its eggs in the East Indies?
664. Describe the Centipede.

LIST OF SOME INSECTS.

1st Order: BEETLES.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. The Purple Tiger-beetle. 2. " Spotted Tiger-beetle. 3. " Carinated Carab. 4. " Long-horned Calosoma. 5. " Bombardier-beetle. 6. " Water-beetle. 7. " Whirligigs. 8. " Rover-beetle. 9. " Boring-beetle. 10. " Common Snapping-beetle. 11. " Two-dotted Snapping-beetle. 12. " Cucujo. 13. " Fire-fly. 14. " American Carrion-beetle. 15. " Surinam Carrion-beetle. 16. " Large Gravedigger. 17. " Velvet Gravedigger. 18. " Common Dor-beetle. 19. " Tumble-bug. | <ol style="list-style-type: none"> 20. The Elephant-beetle. 21. " Goliath-beetle. 22. " Sacred-beetle. 23. " Carolina Dung-beetle. 24. " May-chaffer. 25. " Rose-bug. 26. " Stag-beetle. 27. " Meal-beetle. 28. " Spotted Meal-beetle. 29. " Blistering-beetle. 30. " Common Weevil. 31. " Diamond-beetle. 32. " Long-armed Capricorn-beetle. 33. " Short-horned Capricorn-beetle. 34. " Common Tortoise-beetle. 35. " Handsome Chrysomela. 36. " Spotted Chrysomela. 37. " Philadelphia Chrysomela. |
|---|--|

- | | | |
|---------------------------|--|-------------------------------|
| 38. The Cucumber-beetle. | | 40. The Spotless Lady-bird. |
| 39. " Northern Lady-bird. | | 41. " Nine-spotted Lady-bird. |

2d Order : BUGS.

- | | | |
|------------------------------|--|---------------------------------|
| 42. The Common Cockroach. | | 51. The Seventeen-years Locust. |
| 43. " Common Praying-bug. | | 52. " Bedbug. |
| 44. " Common Earwig. | | 53. " Froth-worm. |
| 45. " Field-cricket. | | 54. " Lanthorn-fly. |
| 46. " House-cricket. | | 55. " Water Scorpion. |
| 47. " Mole-cricket. | | 56. " Plant-louse. |
| 48. " Wandering Grasshopper. | | 57. " Kermes. |
| 49. " Carolina Grasshopper. | | 58. " Cochineal Insect. |
| 50. " Common Locust. | | 59. " Lac Insect. |

3d Order : BUTTERFLIES.

- | | | |
|-----------------------|--|-------------------------------|
| 60. The Turnus. | | 71. The Red Admiral. |
| 61. " Asterias. | | 72. " Small Tortoise-shell. |
| 62. " Troilus. | | 73. " Danaus. |
| 63. " Ajax. | | 74. " Carolina Hawk-moth. |
| 64. " Marcellus. | | 75. " Death's-head. |
| 65. " Calchas. | | 76. " Humming-bird Hawk-moth. |
| 66. " Philenor. | | 77. " Ghost-moth. |
| 67. " Thoas. | | 78. " Silkworm. |
| 68. " Idalia. | | 79. " Cecropia. |
| 69. " Mourning-cloak. | | |
| 70. " Painted Lady. | | |

4th Order : NET-WINGED INSECTS.

- | | | |
|---------------------|--|-------------------|
| 80. The Dragon-fly. | | 82. The Ant-lion. |
| 81. " May-fly. | | 83. " Water-moth. |

5th Order : VEIN-WINGED INSECTS.

- | | | |
|--------------------|--|-------------------|
| 84. The Saw-fly. | | 88. The Red Ant. |
| 85. " Gall-fly. | | 89. " Honey-bee. |
| 86. " Ichneumon. | | 90. " Humblebee. |
| 87. " Common Wasp. | | 91. " Golden Fly. |

6th Order : TWO-WINGED INSECTS.

- | | | |
|---------------------|--|---------------------|
| 92. The Cow Gadfly. | | 98. The Meat-fly. |
| 93. " Horse Gadfly. | | 99. " Gnat. |
| 94. " Sheep Gadfly. | | 100. " Hornet-fly. |
| 95. " Crane-fly. | | 101. " Buzz-fly. |
| 96. " Hessian-fly. | | 102. " Horse-louse. |
| 97. " Common Fly. | | |

7th Order : WINGLESS INSECTS.

- | | | |
|----------------------|--|-------------------|
| 103. The Sugar-mite. | | 106. The Flea. |
| 104. " Spring-tail. | | 107. " Sand-flea. |
| 105. " Louse. | | 108. " Tick. |

109. The Mite.	115. The Craw-fish.
110. " Spider.	116. " Horse-shoe.
111. " Scorpion.	117. " Sowbug.
112. " Crab.	118. " Scolopendra.
113. " Pungier.	119. " Centipede.
114. " Lobster.	

AUTHORITIES FOR THE NATURAL HISTORY OF INSECTS.

J. C. Fabricii, Systema Entomologiæ.....	1775
Reaumur, Histoire des Insectes.....	1742
P. A. Latreille, Histoire des Insectes.....	1804
W. Kirby and W. Spence's Introduction to Entomology.....	1818
T. F. Blumenbach's Handbuch der Naturgeschichte.....	1825
Say's American Entomology.....	1825
Dejean, Species général des Coleoptères.....	1825-1831
M. John Le Conte, Histoire générale et Iconographie des Lepidoptères et des Chenille de l'Amerique Septentrionale.....	1833
Oken's Allgemeine Naturgeschichte für alle Stände.....	1836

SECTION XL.

VI. HELMINTHOLOGY.

§ 665. *Helminthology* treats of those animals which have white blood, and no articulated organs of motion; as the Sea-blubber, Shellfish, Intestinal Worms, etc.

§ 666. The abode of those animals which, collectively, are called Worms, is generally in water, and by far the greater part of them in the ocean. Some live underground, and others, as the Intestinal Worms, for instance, exclusively in the living bodies of other animals.

§ 667. Great numbers of them are eatable, as the Shellfish; others afford materials for building houses and paving streets, as Corals; and some are burnt for lime, as the Marine Shells.

§ 668. Among the noxious animals of this class may be mentioned the worms which live in the intestines of the human body, as the Tape-worm, and those found in

many quadrupeds, birds, and fishes. These worms are a fruitful source of disease.

§ 669. The class of Worms may be divided into the following five Orders, viz. :

1st Order.—*Gelatinous Worms*, (Zoophyta, *Lin.* :) the body of which is gelatinous, transparent, and not composed of jointed limbs ; as the Infusory Animalcules, the Polypes, the Sea-blubber, etc.

2d Order.—*Corals*, (*Corallia*, *Lin.* :) which are immoveable stony or horny dwellings of minute animals, similar to Polypes ; as Madrepores, Sea-fans, etc.

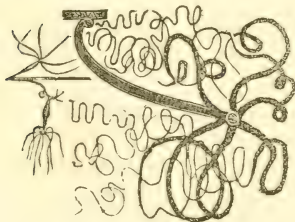
3d Order.—*Shellfish*, (*Testacea*, *Lin.* :) the body of which is partly or entirely enclosed in a calcareous shell ; as Oysters, Snails, and Cuttlefish.

4th Order.—*Prickly Worms*, (*Echinodermata*, *Cuv.* :) the body of which is cartilaginous, in some cases with a calcareous crust, and covered with prickles ; as Sea-stars, and Sea-urchins, (the Sea-eggs of the cabinets.)

5th Order.—*Long-bodied or True Worms*, (*Intestina*, *Lin.* :) which have a skin composed of jointed links, and are without any external organs of motion ; as Earth-worms, Leeches, and Tape-worms.

1st Order.—GELATINOUS WORMS.

Fig. 33.



THE HYDRA.—(*Hydra fusca*.)

2d Order.—CORALS.

Fig. 39.

NEPTUNE'S RUFFLES.—(*Retepora cellulosa*.)

3d Order.—SHELLFISH.

Fig. 40.

THE SHIP-WORM.—(*Teredo navalis*.)

4th Order.—PRICKLY WORMS.

Fig. 41.

EDIBLE SEA-URCHIN.—(*Echinus esculentus*.)

5th Order.—LONG-BODIED WORMS.

Fig. 42.

THE VARIEGATED SLUG.—(*Limax variegatus*.)

QUESTIONS ON SECT. XL.

665. What does Helminthology treat of?
666. Where are Worms found?
667. What use is made of this Class?
668. Which are the noxious animals of this Class?
669. Into how many Orders is it divided? Name and describe them.

SECTION XLI.

1st Order—GELATINOUS WORMS : (*Zoophyta*, Lin.)

¶ 670. Among the Gelatinous Worms may be mentioned the *Infusory Animalcules*, which are the lowest and smallest of living creatures. Their body is nothing but a stomach with a mouth, and can only be seen by means of a microscope which magnifies more than one hundred times.

¶ 671. These animalcules are to be found in immense numbers in any fluid in which organic substances have been decomposed. One single drop will present hundreds of them, resembling little balls, moving about at pleasure; whilst others of a larger size and different form will be seen swimming like whales among them.

¶ 672. The green slimy substance, found on water-plants, posts, and stones, will also furnish a great variety of them.

¶ 673. That they are real animals, is evinced by the power they possess of moving in all directions; and by their taking food, which they effect, by bringing the water around them into a whirl by a rapid motion of the hair at their mouth, into which other still smaller animalcules are drawn.

¶ 674. The smallest of these animals is the *Monada*, which is round like a ball, and may not exceed the thousandth part of a line; and the largest is the *Wheel-animal*, half a line long, which is found upon the leaves of the Water-crowfoot, as well as other water-plants.

¶ 675. The *Polypes* are gelatinous, living contractile tubes, with arms as thin as a human hair, by which they seize their prey.

¶ 676. Their food consists, according to their size, of Infusory Animalcules, small Crabs, Earthworms, Fishes, or tender water-plants.

¶ 677. They are found in large numbers on water-plants, in all stagnant waters, and can easily be obtained

for examination by taking some of the water and pouring it into tumblers. After a short time the Polypes will be seen attached to the glass.

§ 678. The body of the Polype is as thick as a quill, and one inch long, with from six to twelve arms of the same length, which will be seen hanging down from the glass, on which it sticks with the unperforated extremity. It moves in the same manner as a Leech.

§ 679. The construction of the Polype, and its reproduction, are very astonishing; for being merely a gelatinous open channel, it has no intestines, and may be turned inside out without the least injury; besides, it may be cut into many pieces, and each piece, after a few days, will become a new Polype.

§ 680. These Polypes are green or brown, black or red, and can be kept alive more than two years, if they are fed with earth-worms, plant-lice, or very small fishes. The manner in which the Polype seizes, with its arms, the substance on which it feeds, will excite the admiration of the student of Natural History.

§ 681. The *Sea-blubber* (*Medusa*) has a gelatinous naked body, generally round like a ball, interwoven with arteries for the purpose of sucking water; and having on the sides a number of thread-like organs, or arms, for seizing its prey and conveying it to its mouth, which is in the central part of its body.

§ 682. These animals, which are of a beautiful bluish-white color, vary in size and form. They are frequently seen in the tropics, floating on the surface of the sea. As they are almost motionless, they are often driven by winds and waves on the shores, where they soon dissolve, and dry up to a mere membrane.

§ 683. Sea-blubbers are of no use to man. Their touch produces red spots on the skin, and causes an unpleasant feeling, like the sting of a nettle. They are often observed at night, skimming over the water, and shining with the most beautiful variegated colors.

It is not improbable that several of these species are the principal ingredients of which the edible birds-nests are made.

QUESTIONS ON SECT. XLI.

670. What are Infusory Animalcules?
671. How can they be obtained, and what will be the effect?
672. What will also furnish a great variety of them?
673. How can it be proved that they are real animals?
674. Which is the smallest, and which the largest of these animals, and where are they found?
675. What are Polypes?
676. Of what does their food consist?
677. How can they be obtained for examination?
678. Describe their body.
679. Why is their construction and reproduction astonishing?
680. What is their color, and how may they be kept alive?
681. Describe the Sea-blubber.
682. What is their general color, size, form, and abode?
683. Of what use are they?
-

SECTION XLII.

2d Order—CORALS: (Corallia, Lin.)

¶ 684. *Corals* are the horny or stony habitations of small Sea-polypes. They are not, however, to be considered habitations, in a sense analogous to the cells of Bees; but rather resemble the shells of Snails, since the young Sea-polype is produced simultaneously with its calcareous dwelling, in the same manner that a twig is pushed out from a tree.

¶ 685. The stony Corals in the torrid zone ascend in large masses from the bottom of the sea towards the surface of the water, and form small islands. Upon these islands the tempestuous waves of the sea throw sand, shells, and sea-weeds; thus, in the course of time, forming a soil, and rendering them habitable.

¶ 686. The injury sometimes done by Corals is considerable. They often block up the channels of sea-ports; and when near the surface of the ocean, but not sufficiently so as to be discoverable by the mariner, are frequently the cause of shipwreck.

§ 687. The bodies of Sea-polypes are fastened to the stem and branches of Corals, which are full of minute cells. From these they stretch out their limbs and bodies, presenting in many cases a variety of colors, and causing the bottom of the sea, in some places, to resemble a meadow covered with the most splendid flowers.

§ 688. The *Red Coral* (*Isis nobilis*) is about one foot long, as thick as a finger, and inhabited by milk-white Polypes, not longer than a line. It is found at the bottom of the sea, from 12 to 120 feet deep, and obtained with great difficulty by means of a net, stretched on two poles, each about eighteen feet long, and which cross each other.

§ 689. They are collected principally on the shores of the Mediterranean, and manufactured at Marseilles into various works of art, such as rosaries, cane-tops, knife-handles, necklaces, etc., which in the East Indies, but more especially in China and Japan, are held in nearly as high estimation as precious stones.

§ 690. The *Horn-corals* (*Gorgonia*) consist mostly of a brown or black horn-like stem, covered with a calcareous red or yellow crust, on which are found numerous wart-like cells, inhabited by polypes.

§ 691. The stem of the Horn-coral resembles, at the lower extremity, a broad lobated foot, fastened to the ground. Its upper part, in some species, contains twin-like branches, resembling a broom, and which in some other species, are flat and united like network. The first are called *Sea-brooms*, the latter, *Sea-fans*.

§ 692. The *Gorgonias*, which are from one to twelve feet high, are found near the sea-shore, chiefly in the tropics, though they are met with north and south of that region. The observer is much amused by their incessant motion; for as they are rendered elastic by the horny substance of which they are composed, they are kept continually swaying by the waves of the sea; so that, to the eye of the beholder, the Sea-broom is apparently sweeping, while the Sea-fan is engaged in fanning the surface of the water.

QUESTIONS ON SECT. XLII.

684. What are Corals?
 685. How are islands formed by stony Corals?
 686. In what consists the injury done by Corals?
 687. What do you know of the body of Sea-polypes?
 688. Describe the Red Coral. How is it obtained?
 689. Where is it collected, and where manufactured into several articles of art?
 690. Describe the Horn-coral.
 691. What are Sea-brooms and Sea-fans?
 692. Where are they found, and what is their size and singularity?

SECTION XLIII.

3d Order—SHELLFISH : (*Testacea*, Lin.)

¶ 693. *Shellfish* are those worms which are enclosed in a calcareous shell ; as Clams, Snails, etc.

¶ 694. The calcareous substance of Shell-fish is gradually formed, as the creature grows, from the slimy fluid of its body, which attaches itself to the edge of its opening, becomes solid, and increases the size of the shell.

¶ 695. Many of the shells are deserving of notice for their wonderful structure ; others for their glittering porcelain-like glazing, their splendid colors, or their regular and delicate marks ; while many of them are interesting from their importance as articles of food for man.

¶ 696. Shellfish are more perfect than the preceding Orders, as they are provided with arteries and veins, with a heart and liver, and some of them with a head and eyes.

¶ 697. The lower extremity of their body, which is musculous, is in many species prolonged to enable the animal to move its body ; which prolongation, for that reason, is called a foot, as in snails.

¶ 698. The wisdom of the Creator has covered these delicate animals with hard shells, to preserve their soft bodies from injury, embellishing them, at the same time, with elegant forms and the most splendid colors.

¶ 699. The greater part of them are carnivorous ; they swallow other small animals or suck the juices of their bodies. Only the land and soft-water shells are herbivorous.

¶ 700. This extensive order is divided into two families, according to the number of their shells ; those with two shells, as *Muscles*, and those with one shell, as *Snails* and *Cuttlefish*.

¶ 701. The *Muscle* may be compared to a human body without head, arms, or legs, and compressed on both sides. To each side of the back is attached a pair of ribbon-like cross-barred gills, resembling a neck-ruffle ; these, which are enveloped in the skin of the breast, and called a cloak, are similar to a waist-coat, while around them are situated two shells, like a jacket. On the inside of the cloak lies the wide mouth, surrounded by four tri-cornered lobes, which are striped like the gills. From one shoulder to the other runs a strong muscle, and a second one between the two hips, which are fastened to the shells, and effect their opening and closing.

¶ 702. The shell of the *Stone-piercer* (*Pholas Dactylus*) is four inches long, with net-like stripes. It is found in France and Italy, (principally in Trieste,) and in the stone walls of the canals of the city of Venice.

¶ 703. The body of this animal is provided with several moveable respiratory tubes, about the thickness of a finger, and projecting from the shell.

¶ 704. The *Stone-piercer* is quite injurious, on account of its boring passages in rocks, (even in the hardest marble,) the stems of coral, oyster-shells, and the bottom of ships. Its flesh excels in tenderness and delicacy the oyster.

¶ 705. As the shell of this creature is very fragile, it is obliged to seek for protection in a harder substance than that of its own shell. The astonishing fact, that such a weak worm is able to bore holes in a hard rock, may be explained by that law of nature by which a very small force, in constant action, produces more effect than a great force, acting at intervals. This fact may illustrate our application to mental pursuits.

¶ 706. The body of the *Razor-shell* (*Solen*) has a tubi-

form cloak, covered with two long shells, open at both ends, and is from six to eight inches long. It is found in many seas, but principally on the shores of Italy.

¶ 707. The Razor-shells conceal themselves in the sand by boring perpendicular holes about three feet deep. They are esteemed a palatable article of food. The fishermen catch them at low tide by putting strong wires, with a knob at the end, into their holes. The wire passes between the open perpendicular standing shell, which closes at the first touch of the wire, and is thus thrown out.

¶ 708. The *Oyster* (*Ostrea*) is found in all parts of the globe, and is everywhere considered a wholesome and delicious food.

¶ 709. Oysters, like all other Shellfish, are provided with shells while yet in the egg: these, which are not larger than the tenth part of a line, are yearly increased by the addition of a new layer, several lines broad, to their margin. The Oyster, therefore, which has two layers around the shell, is three years old.

¶ 710. The immense multiplication of oysters would be incredible, if it had not been ascertained that a single one produces from three to four millions of eggs; a fact which may be easily verified by means of a microscope, in the months of June, July, and August, when they are found within the shell, dispersed over all parts of the body.

¶ 711. The *Pearl-oyster* (*Mytilus margaritifer*) is as large as a man's hand, and of a roundish form.

¶ 712. It is important for the precious pearls found within it, as well as for the mother-of-pearl afforded by the shells.

¶ 713. There are three pearl-fisheries carried on in Asia; viz. in the Gulf of Persia; in Ceylon, near the town of Manaren; and in the Island of Hainem, near Japan. The Pearl-oyster is also obtained in America, on the coast of Cumana, Mexico, and California.

¶ 714. These shells are found on the bottom of the sea, generally at a depth of from twenty to thirty feet. They are obtained by divers; who, as well as others engaged

in the pursuit, incur the risk of life in the occupation. The diver is constantly in peril from suffocation and sharks; while the oysters, exposed to the sun, and putrefying in numberless quantities, produce diseases, by which thousands of those employed are carried off in a few weeks.

§ 715. The value of pearls is estimated according to their size, the larger ones being as valuable as the most precious stones. A pearl weighing one grain is sold for one dollar; but a very large one has brought \$10,000; and one which the Venetian Republic presented to the Turkish emperor, was valued at \$100,000.

§ 716. Precious pearls commanded in Rome a price beyond that of all other luxuries; and Pliny relates that a certain Lolius Paulina, the grand-daughter of a Roman proconsul, or governor, was seen at a dinner-party, having her head, neck, ears, and fingers ornamented with pearls, the value of which was estimated at a million of dollars.

§ 717. The importation of precious pearls into China amounts every year to \$25,000, and that of mother-of-pearl to \$70,000.

§ 718. The Soft-water Shells are brown, oval, flat, and horny, and are found in rivers and canals.

QUESTIONS ON SECT. XLIII.

693. What are Shellfish?
694. How is their shell formed?
695. Why are many of the shells deserving of notice?
696. In what respect are they more perfect than the preceding Orders?
697. What is called the foot of the Shellfish?
698. Why has Providence covered them with hard shells?
699. What do they eat?
700. Into what families is the Order of Shellfish divided?
701. Describe the body of a Muscle.
702. What is the size of the Stone-piercer, and where is it found?
703. What do you know of its respiratory tubes?
704. In what respect is it injurious or useful?
705. Why is it obliged to bore holes, and how may the fact be explained?
706. Describe the Razor-shell.
707. What do you know of its abode, use, and the manner of catching it?
708. What is the use of the Oyster, and where is it found?
709. What do you know of the egg and growth of the Oyster?

710. How many eggs does one Oyster produce, and at what time?
 711. What is the size and form of the Pearl-oyster, and where is it found?
 712. Why is it remarkable?
 713. Where are the Pearl-fisheries in Asia, and where are Pearls in America obtained?
 714. How are the shells of the Pearl-oyster obtained, and what are the dangers of the Pearl-fisheries?
 715. What is the value of precious Pearls?
 716. What does Pliny relate in regard to precious Pearls?
 717. What is the amount of the importation of Pearls and Mother-of-Pearl into China?
 718. What do you know of Soft-water Shells?



(SECTION XLIII. CONTINUED.)

§ 719. The *Univalve Shellfish*, the body of which is enclosed in a single shell, are still more perfect than the Bivalves, for they are provided not only with arteries, veins, a heart and liver, but also with a head and two eyes, and at its anterior extremity, with two retractile tentacula, (thread-like projections upon the head,) as the Snail, Cuttle-fish, Nautilus, etc.

§ 720. Among the Univalve Shells, the *Cowry* (*Cypræa Moneta*) is deserving of notice, from the use made of it as money in the East Indies, the South Sea Islands, and by the nations on the coast of Africa.

§ 721. In Bengal, 2,500 are worth about one quarter of a dollar; and yet there are articles in the markets which may be bought for a single Cowry—Arcca-nuts, for example.

§ 722. The Cowry is a porcelain-like shell of a pale-yellow color, sometimes with an orange-colored ring on the back, and white below; it is scarcely an inch long, and about the thickness of a finger.

§ 723. The *Whelk*, (*Buccinum*), with its different species, has the form of a helmet; as, for instance, the *Harp*, (*Buccinum Harpa*), distinguished by its beautiful flesh-color, mixed with brown and white spots.

§ 724. The eggs of many species of the Whelk are

called, from their appearance, Sea-grapes, or Sea-hop; whilst in others they form a long row of horny, flat capsules, which lie close to one another, fastened by one edge to the rib, which is a foot long.

§ 725. The genus *Periwinkle* (*Helix*) consists mostly of land and fresh-water snails, many of which are used as food.

§ 726. The *Cuttlefish* (*Sepia*) has a cylindric body in a wide open cloak, and is covered on the back with a shell or plate of the form of a lancet. From the cloak projects a thick head with two large eyes, and a number of fleshy arms surround the mouth, which has the form of a parrot's bill.

§ 727. The processes on their arms, which in some species exceed a thousand, increase with the age of the animal, and are reproduced when nipped off by fishes.

§ 728. Most of the species are remarkable for the blackish-brown fluid, contained in a particular receptacle, which they eject at pleasure, and by that means darken the water around them; thus making themselves invisible to an approaching enemy. This black substance formed the ink of the ancients, and is probably the principal ingredient of the Chinese or India ink.

§ 729. Some of these species, as the *Calmar*, (*Sepia Loligo*.) are used as food by some people; but they seem designed principally as food for fishes. The *Calmar* is seen in such quantities in the seas of Newfoundland and Labrador, as literally to cover the surface of the water, and forms, in the month of August, almost the only food of the Codfish.

§ 730. The *Cuttlefish* are found in most parts of the ocean. Their length is from one inch to several feet, according to the species; as, for instance, the *Eight-armed Cuttlefish*, (*Sepia Octopoda*.) found in the East Indies, as well as in the Gulf of Mexico, which is six feet long, and eatable: but dangerous, however, to those who are bathing, on account of its long and strong arms.

§ 731. The *Common Cuttlefish*, (*Sepia officinalis*.) about ten inches long, is found in the Mediterranean,

principally in the Lagunes of Venice, where its flesh is sold as food, and its coloring substance as an article of paint; while the large bony plate of its back serves as a polishing instrument, and is used also in medicine, (os sepiæ of the druggist.)

§ 732. The *Nautilus*, (*Nautilus Pompilius*), which has a reddish-brown body, about five inches in length and three inches thick, with arms like the Cuttlefish, inhabits a round whitish shell, with yellow and red stripes. The shell, which has a large opening, is lined inside with mother-of-pearl, and divided into chambers, in the anterior of which the animal lives, making itself heavier or lighter at pleasure, by pumping water into or out of the other chambers.

QUESTIONS ON SECT. XLIII.

719. In what respect are Univalve Shells more perfect than Bivalves?

720. What do you know of the Cowry?

721. What is its value?

722. Describe it.

723. What do you know of the Whelk and the Harp?

724. What do you know of the eggs of the Whelk?

725. Of what shells does the genus Periwinkle consist?

726. Describe the Cuttlefish.

727. What do you know of their arms?

728. What do you know of their blackish-brown fluid?

729. Of what use are Cuttlefish?

730. Where are they found, and what is their size?

731. What is the size and use of the Common Cuttlefish?

732. Describe the *Nautilus*.



SECTION XLIV.

4th Order—PRICKLY WORMS: (*Echinodermata*, Cuvier.)

§ 733. The *Prickly Worms* have a cartilaginous body, in some cases with a calcareous crust, and are covered with prickles; as the Sea Hedge-hog, the Sea-star, etc.

§ 734. The *Sea Hedge-hog* (*Echinus*) has a round or

oval crustaceous body, according to the species, is one or several inches long, white or rose-colored, and is generally called Sea-egg, on account of its form.

¶ 735. Its crustaceous body is covered with a skin, containing nearly 2,000 prickles, which, as its skin is moveable, enable it to creep at the bottom of the sea.

¶ 736. These prickles are an inch and more long, not thicker than a fine needle, shining and pointed, brittle as glass, and of a brown or black color.

¶ 737. The *Eatable Sea Hedge-hog* (*Echinus esculentus*) is about as large as a man's hand, and is the only species that is used as food. The part eaten is the ovary, (receptacle of eggs,) which, when boiled, is considered a great delicacy.

¶ 738. The *Sea-star* (*Asterias*) has a cartilaginous body in the form of a star, consisting generally of five points, which are covered with short prickles. By means of these they move in the same manner as the *Sea Hedge-hog*, but with less speed.

¶ 739. In the upper part of its body is a wide mouth, near which is a stomach, connected with intestines extending through the rays.

¶ 740. The reproductive power of this animal is very remarkable. If the rays be cut off they will grow again; and if cut into several pieces, each piece becomes a new *Star-fish*.

QUESTIONS ON SECT. XLIV.

733. What are Prickly Worms?

734. Describe the *Sea Hedge-hog*.

735. By what means does it creep?

736. Describe its prickles.

737. What is the size and the use of the *Sea Hedge-hog*?

738. Describe the *Sea-star*.

739. What do you know of its internal construction?

740. What can you say of its reproductive power?

SECTION XLV.

5th Order—LONG-BODIED WORMS: (*Intestina*, Lin.)

§ 741. The *Long-bodied Worms* have long gelatinous bodies, the skin of which is composed of jointed links, and are without any external organ of motion; as *Leeches*, *Earth-worms*, and *Intestinal Worms*.

§ 742. The *Common Leech* (*Hirudo medicinalis*) is one finger in length and half a finger in thickness, of a darkish color, with eight yellow, black, and red stripes above, and with yellow spots below. It has ten eyes around the head and mouth, with two rows of very minute teeth, with which it opens the skin when it begins to suck.

§ 743. *Leeches* are found in Europe, in brooks and ponds, where they are very injurious to fish, which they destroy by sucking their blood. They are an important article of commerce, being extensively used as a substitute for bleeding.

§ 744. They can be easily raised in reservoirs made of wood, where they propagate by their spawn: this, hardening to a sponge-like bladder, splits after a short time on one side, and the young ones come out.

§ 745. The *Earth-worm* (*Lumbricus terrestris*) has a mouth, but no eyes, is six inches or more long, and of the thickness of a quill. It is of a red color, which deepens in the middle, where is seen a tumor-like swelling. Its body consists of 140 jointed links.

§ 746. The ring-like accumulation in the middle, called a saddle, is not a real tumor, but the breathing apparatus of the animal, consisting of very minute gills.

§ 747. The *Earth-worm* possesses great powers of reproduction. If the twenty-sixth part of one be cut off it will become, within a few months, a perfect worm, as long as the one from which it was severed. Its natural increase is effected either by producing young ones, or casting them off like buds.

§ 748. The *Portuguese Man-of-War* (*Holothuria physalis*) is found in the Atlantic Ocean. Its body is about

the size of the fist, varying in color from blue to red. Along the back is a very delicate membrane for sailing, which the animal, when swimming, inflates with air.

¶ 749. The *Round-worm* (*Ascaris Lumbricoides*) is the most common of human intestinal worms, found principally in the small intestines, and sometimes in vast numbers.

¶ 750. It is generally as thick as a quill, nearly one foot long, and of a whitish color; it is oviparous, and is found also in cows, hogs, and horses.

¶ 751. The *Tape-worm* (*Tænia*) comprises a large number of different species. It is notable as well for the peculiarity of its structure as for the injury it does to the human body, and the tenacity with which it clings to it.

¶ 752. This worm is articulated, and attaches itself by means of the pointed proboscis projecting from its head with four lobes. Next to the head is a small and almost thread-like neck, the joints of which become gradually larger as they approach the body. In each of the larger joints is an ovary, from which the eggs escape.

QUESTIONS ON SECT. XLV.

741. What are Long-bodied Worms?
742. Describe the Leech.
743. What injury do they do, and for what are they used?
744. How can they be raised?
745. Describe the Earth-worm.
746. What do you know of its saddle?
747. What do you know of its reproductive power and increase?
748. Describe the Portuguese Man-of-War.
749. Which is the most common human intestinal worm?
750. Describe the Round-worm.
751. For what is the Tape-worm notable?
752. Describe the Tape-worm.

LIST OF SOME WORMS.

1st Order.—GELATINOUS WORMS.

- | | |
|----------------------|----------------------------|
| 1. The Monade. | 7. The Plume-polype. |
| 2. " Proteus. | 8. " Sea-fig. |
| 3. " Wheel-animal. | 9. " Common Sea-blubber or |
| 4. " Blossom-polype. | Sea-nettle. |
| 5. " Hydra. | 10. " Purple Sea-nettle. |
| 6. " Sertularia. | |

2d Order.—CORALS.

- | | |
|----------------------|---------------------------|
| 11. The Royal Coral. | 16. The Sea-horn. |
| 12. " Red Coral. | 17. " Black Coral. |
| 13. " Sea-fan. | 18. " Sea-pine. |
| 14. " Sea-broom. | 19. " Prickly-pear Coral. |
| 15. " Reed Gorgonia. | 20. " Eyed Madrepor. |

3d Order.—SHELLFISH.

- | | |
|----------------------------|---------------------|
| 21. The Acorn-shell. | 39. The Cowry. |
| 22. " Diadem. | 40. " Dipper. |
| 23. " Cornucopia. | 41. " Rhomb-shell. |
| 24. " Barnacle. | 42. " Harp. |
| 25. " Stone-piercer. | 43. " Screw. |
| 26. " Razor-shell. | 44. " Rock-shell. |
| 27. " Cockle. | 45. " Top-shell. |
| 28. " Venus. | 46. " Staircase. |
| 29. " Clam. | 47. " Beauty. |
| 30. " Gigantic Clam. | 48. " Whirl-wreath. |
| 31. " Ark. | 49. " Common Snail. |
| 32. " Common Oyster. | 50. " Sea-ear. |
| 33. " Pearl-oyster. | 51. " Limpet. |
| 34. " Sea-wing. | 52. " Tooth-shell. |
| 35. " Nautilus. | 53. " Worm-shell. |
| 36. " Sailor. | 54. " Watering Pot. |
| 37. " Admiral. | 55. " Calmar. |
| 38. " Leopard Cowry-shell. | |

4th Order.—PRICKLY WORMS.

- | | |
|--------------------------------|--------------------------|
| 56. The Eatable Sea Hedge-hog. | 58. The Red Sea-star. |
| 57. " Orbicular Sea Hedge-hog. | 59. " Northern Sea-star. |

5th Order.—LONG-BODIED WORMS.

- | | |
|---------------------------|------------------------------|
| 60. The Hair-worm. | 66. The Common Leech. |
| 61. " Earth-worm. | 67. " Horse-leech. |
| 62. " Fluke. | 68. " Great Slug. |
| 63. " Common Tape-worm. | 69. " Black Slug. |
| 64. " Globular Tape-worm. | 70. " Field Slug. |
| 65. " Round-worm. | 71. " Portuguese Man-of-War. |

REFERENCES ON THE NATURAL HISTORY OF WORMS.

- J. B. Lamarck, *Histoire naturelle des Animaux sans Vertébrés*....1816
T. F. Blumenbach's *Handbuch der Naturgeschichte*.....1825
L. Oken's *Naturgeschichte für alle Stände*.....1835
Ehrenberg über Infusorien.....1830

INDEX.

A.

Abdominales, 108. 120.
 Abdominal Fishes, 108. 120.
 Acarus, 149.
 Accipenser, 114.
 Accipitres, 66. 69.
 Acheta, 138.
 Adder, 95.
 African Elephant, 55.
 " Rhinoceros, 56.
 Agami, 99.
 Alligator, 99.
 Alosa, 120.
 American Badger, 32.
 " Hare, 44.
 " Lion, 38.
 " Ostrich, 82.
 " Otter, 36.
 " Shad, 120.
 " Tiger, 38.
 " Toad, 103.
 Ampelis, 72.
 Amphibia, 28.
 Anal-fins, 106.
 Anas, 84.
 Angora Goat, 50.
 Animalcules, 158.
 Anseres, 66. 83.
 Ant, 145.
 Ant-eater, 58.
 Antens, 125.
 Antelope, 49.
 Ant-lion, 142.
 Ape, 24.
 Apis, 144.
 Apodal Fishes, 108. 116.
 Aptera, 127. 149.
 Aranea, 149.
 Arctic Fox, 34.
 Arctomys, 43.
 Arctuated Bat, 29.
 Ardea, 82.
 Armadillo, 59.

Arvicola, 42.
 Ascaris, 171.
 Asiatic Elephant, 54.
 " Rhinoceros, 55.
 Ass, 46.
 Asterias, 169.
 Avis, 15.

B.

Baboon, 25.
 Badger, 32.
 Balæna, 61.
 Baltimore Oriol, 75.
 Barbary Ape, 25.
 Barking Wolf, 33.
 Bat, 28.
 Batrachia, 89. 101.
 Bear, 30.
 Bear-like Baboon, 26.
 Beaver, 41.
 Bee, 144.
 Beetle, 126. 132.
 Bimanus, 22.
 Birds of prey, 66. 69.
 Bison, 51.
 Bisulca, 19. 47.
 Black Bear, 31.
 " Bird, 15.
 " Rat, 42.
 " Snake, 95.
 " Squirrel, 43.
 " Whale, 61.
 " Wolf, 33.
 Blatta, 137.
 Blue-bird, 72.
 Boa, 94.
 Boblink, 74.
 Bombardier, 133.
 Bombyx, 141.
 Bos, 51.
 Botany, 15.
 Box-turtle, 101.
 Brachinus, 133.

Bradypus, 57.
 Branchiostegi, 108. 114.
 Brown Swift, 99.
 Buccinum, 166.
 Buffalo, 51.
 Bufo, 103.
 Bugs, 126. 137.
 Bullfrog, 101.
 Bunting, 74.
 Butterfly, 126. 140.

C.

Cachelot, 62.
 Calmar, 167.
 Calosoma, 132.
 Camel, 47.
 Camelopardalis, 49.
 Camelus, 47.
 Campagnol, 42.
 Canada Porcupine, 43.
 Cancer, 150.
 Canis, 32.
 Canvass-back, 84.
 Capra, 50.
 Capricorn-beetle, 136.
 Capuchin, 26.
 Cardinal-bird, 74.
 Carnivora, 19. 28.
 Carolina Bat, 29.
 Carrion-beetle, 134.
 Cartilaginous Fishes, 108. 112.
 Castor, 41.
 Cat, 37.
 Caterpillar, 125.
 Caterpillar-hunter, 132.
 Cat-like Ape, 25.
 Cat-squirrel, 43.
 Caucasian Variety, 22, 23.
 Caudal-fin, 106.
 Cavia, 44.
 Cayman, 99.
 Cebus, 24. 26.
 Cedar-bird, 72.
 Centipede, 151.
 Cerambyx, 136.
 Cercopithecus, 24.
 Cervus, 48.
 Cetacea, 19. 60.
 Chameleon, 99.
 Cheese-fly, 148.
 Chelonia, 89. 100.
 Chimpanse, 25.
 Chiroptera, 28.
 Chondropterygii, 108. 111.
 Chrysalis, 125.

Cicada, 139.
 Cicindela, 132.
 Climbers, 66. 76.
 Cloven-hoofed Mammalia, 19. 47.
 Clupea, 120.
 Coaita, 26.
 Coccinella, 136.
 Cocoon, 125.
 Cock, 79.
 Cock-chaffer, 134.
 Cockroach, 137.
 Codfish, 117.
 Coleoptera, 126. 132.
 Coluber, 95.
 Columba, 80.
 Common Cuttle-fish, 167.
 " Deer, 49.
 " Gray Squirrel, 43.
 " Hare, 44.
 " Hen, 79.
 " Leech, 170.
 " Seal, 39.
 " Sturgeon, 115.
 " Wolf, 33.

Condor, 69.
 Condylura, 30.
 Copperhead, 95.
 Corals, 155. 160.
 Cougar, 38.
 Cowry, 166.
 Crab, 150.
 Cramp-fish, 111.
 Crane, 82.
 Crane-fly, 117.
 Crawfish, 150.
 Cricket, 138.
 Crocodile, 98.
 Crotalus, 94.
 Culex, 146.
 Curculio, 135.
 Cuttlefish, 167.
 Cynocephalus, 24.
 Cypræa, 166.
 Cyprinus, 121.

D.

Dasypus, 59.
 Day-butterfly, 140.
 Day-fly, 142.
 Delphinus, 63.
 Diamond-beetle, 126.
 Diptera, 127. 146.
 Dipus, 44.
 Dog, 32.
 Dolphin, 63.

Dorsal-fins, 106.
 Dragon-fly, 141.
 Dromedary, 47.
 Drones, 144.
 Duck, 84.
 Duck-bill, 58.
 Dusky Wolf, 33.
 Dyticus, 133.

E.

Eagle, 70.
 Earth-worm, 170.
 Eatable Bird's-nest, 74.
 " Sea Hedgehog, 169.
 Echinodermata, 155. 168.
 Echinus, 168.
 Edentata, 19. 57.
 Eel, 116.
 Eight-armed Cuttlefish, 167.
 Elater, 134.
 Electric Eel, 116.
 " Ray,
 Elephant, 54.
 Elk, 48.
 Emberiza, 74.
 Entomology, 16. 125.
 Ephemera, 142.
 Equus, 45.
 Erinaceus, 30.
 Ermine, 35.
 Erpetology, 16. 89.
 Ethiopic Variety, 22, 23.

F.

Falco, 70.
 Felis, 37.
 Ferret, 34.
 Field-cricket, 138.
 Field-mouse, 42.
 Firefly, 134.
 Fish, 15. 106.
 Fish-like Mammalia, 19. 60.
 Flamingo, 82.
 Flea, 149.
 Flesh-eaters, 28.
 Flounder, 118.
 Fly, 146.
 Flying-dog, 29.
 Flying-squirrel, 43.
 Four-handed Mammalia, 24.
 Fox, 33.
 Fox-monkey, 26.

Fox-squirrel, 43.
 Fringilla, 74.
 Frog, 89, 101.

G.

Gad-fly, 147.
 Gadus, 117.
 Gallinaceous Birds, 66. 78.
 Gallinæ, 66. 78.
 Gasterosteus, 119.
 Gavial, 98.
 Gazelle, 50.
 Gelatinous Worms, 155. 158.
 Gerbillus, 45.
 Gigantic Sea-serpent, 95.
 Giraffe, 49.
 Glires, 19. 41.
 Glow-worm, 134.
 Glutton, 31.
 Gnawers, 19. 41.
 Gnou, 50.
 Goat, 50.
 Golden-winged Woodpecker, 77.
 Goldfinch, 74.
 Gold-fish, 121.
 Goose, 84.
 Gorgonia, 161.
 Grallæ, 66. 82.
 Grampus, 62.
 Grasshopper, 138.
 Gray-fox, 34.
 Great Ant-eater, 58.
 Green Turtle, 101.
 Ground-hog, 43.
 Ground-squirrel, 43.
 Grub, 125.
 Gryllus, 138.
 Gryphus, 69.
 Guana, 99.
 Guenon, 24.
 Guinea-hen, 79.
 Guinea-pig, 44.
 Gull, 83.
 Gulo, 31.
 Gymnotus, 116.
 Gyrinus, 133.

H.

Halibut, 119.
 Halmaturus, 40.
 Hammer-fish, 108.
 Hand-winged Flesh-eaters, 28.
 Hare, 44.

Harp, 166.
 Hawk, 70.
 Hawk-moth, 141.
 Hedgehog, 30.
 Helix, 167.
 Helminthology, 16. 154.
 Hemiptera, 126. 137.
 Hen-like Birds, 66. 78.
 Herbivorous, 15.
 Hermine, 34.
 Heron, 82.
 Herring, 120.
 Hessian-fly, 147.
 Hippopotamus, 54.
 Hirudo, 170.
 Hirundo, 72.
 Hoary Bat, 29.
 Hog, 52.
 Holothuria, 170.
 Homo, 22.
 Honey-bee, 144.
 Hornet, 144.
 Horn-coral, 161.
 Horse, 45.
 Horse-fly, 148.
 Horse-shoe Fish, 151.
 House-cricket, 138.
 Humming-bird, 75.
 Hydra, 155.
 Hyena, 34.
 Hymenoptera, 126. 143.
 Hystrix, 43.

I.

Ichneumon, 144.
 Ichthyology, 16. 106.
 Iguana, 99.
 Infusoria, 158.
 Insects, 15. 125.
 Insect-eaters, 28, 29.
 Insectivora, 28.
 Instinct, 15.
 Intestina, 155. 170.
 Isis, 161.

J.

Jackal, 34.
 Jaculus, 44.
 Jaguar, 38.
 Jugulares, 108. 117.
 Jugular Fishes, 108. 117.
 Jumping Hare, 44.
 " Mouse, 45.

K.

Kangaroo, 40.

L.

Lacerta, 99.
 Lady-bird, 136.
 Lady-cow, 136.
 Lake-sturgeon, 115.
 Lampyris, 134.
 Larus, 83.
 Larva, 125.
 Leech, 170.
 Lemur, 25. 27.
 Lepidoptera, 126. 140.
 Lepus, 44.
 Libellula, 141.
 Lizard, 89. 98.
 Lion, 37.
 Llama, 48.
 Lobster, 150.
 Locust, 139.
 Long-bodied Worms, 155. 170.
 Long-legged Birds, 66. 82.
 Long-tailed Apes, 24.
 Louse, 149.
 Loxia, 74.
 Lucanus, 135.
 Lumbricus, 170.
 Lupus, 33.
 Lutra, 36.
 Lynx, 38.

M.

Macaco, 26.
 Mackerel, 119.
 Maggot, 125.
 Maky, 25. 27.
 Malayan Variety, 22, 23.
 Mammalia, 15.
 Mammalogy, 16. 19.
 Man, 22.
 Manati, 39.
 Mandrill, 25.
 Manis, 59.
 Many-hoofed Mammalia, 19. 52.
 Marmot, 43.
 Marsh-campagnol, 42.
 Marsupialia, 28.
 May-chaffer, 134.
 May-fly, 142.
 Meat-fly, 147.
 Medusa, 159.

Meleagris, 78.
 Meles, 32.
 Melolontha, 134.
 Mephitis, 36.
 Milk-snake, 95.
 Mineralogy, 18.
 Mink, 35.
 Mocking-bird, 72.
 Mole, 30.
 Mole-cricket, 138.
 Monada, 158.
 Mongolian Variety, 22, 23.
 Mongoz, 27.
 Monkey, 24.
 Monodon, 60.
 Moose-deer, 48.
 Morse, 38.
 Moschus, 48.
 Moth, 141.
 Mother-of-Pearl, 164.
 Mouse, 42.
 Multungula, 19. 52.
 Mus, 42.
 Musca, 147.
 Muscle, 163.
 Musk, 48.
 Musk-goat, 48.
 Musk-ox, 51.
 Musk-rat, 41.
 Mosquito, 146.
 Mustela, 34.
 Myrmecophaga, 58.
 Myrmeleon, 142.
 Mytilus, 164.

N.

Narwahl, 60.
 Nautilus, 168.
 Necrophorus, 134.
 Net-winged Insects, 126. 141.
 Neuroptera, 126. 141.
 New York Bat, 29.
 North American Parrot, 77.
 Northern Lynx, 38.
 Northern Rattlesnake, 94.
 Norway Rat, 42.
 Numida, 79.
 Nut Weevil, 135.
 Nympha, 125.

O.

Oak-ball, 143.
 Oestrus, 147.

Omnivorous, 15.
 Ondatra, 41.
 One-hoofed Mammalia, 19. 45.
 Ophidia, 89. 92.
 Opossum, 28.
 Orang-outang, 25.
 Oriolus, 75.
 Ornithology, 16. 65.
 Ornithorhyncus, 58.
 Ostrea, 164.
 Ostrich, 82.
 Otter, 36.
 Ouistiti, 26.
 Ovipositor, 144.
 Owl, 71.
 Ox, 51.
 Oyster, 164.

P.

Painted Turtle, 101.
 Panther, 38.
 Papilio, 126. 140.
 Papio, 24.
 Parrot, 76.
 Passenger Pigeon, 80.
 Passeres, 66. 72.
 Pavo, 78.
 Peacock, 78.
 Pearl-oyster, 164.
 Peccary, 53.
 Pectoral-fins, 106.
 Pediculus, 149.
 Pelican, 84.
 Pennant's Marten, 35.
 Periwinkle, 167.
 Phasianus, 79.
 Phoca, 39.
 Phœnicopterus, 82.
 Pholas, 163.
 Physeter, 62.
 Picus, 77.
 Pigmy Musk, 48.
 Pierce-stone, 163.
 Pilot-fish, 119.
 Pine-martin, 35.
 Pinna, 106.
 Pisces, 15.
 Pleuronertes, 119.
 Pole-cat, 36.
 Polypes, 158.
 Porcupine, 43.
 Porpoise, 62.
 Portuguese Man-of-War, 170.
 Pouched Flesh-eaters, 28. 40.
 Prairie-wolf, 33.

Precious Pearls, 165.
 Prickly Worms, 155. 168.
 Procyon, 30.
 Prong-horned Antelope, 50.
 Psittacus, 77.
 Pteropus, 29.
 Pulex, 149.
 Puma, 38.

Q.

Quadrumanus, 24.
 Queen-bee, 144.

R.

Rabbit, 44.
 Raccoon, 30.
 Raja, 111.
 Ramphastos, 77.
 Rana, 101.
 Rat, 42.
 Rattlesnake, 94.
 Ray, 111.
 Razor-shell, 163.
 Red-bird, 72.
 Red Coral, 161.
 Red Preacher, 26.
 Red-winged Starling, 75.
 Reindeer, 48.
 Reptiles, 15. 89.
 Rhinoceros, 55.
 Ribbed-faced Baboon, 25.
 Rice-bird, 74.
 River-horse, 54.
 Rocky-mountain Goat, 51.
 Rooster, 79.
 Round-worm, 171.
 Rover-beetle, 133.
 Ruby-throated Humming-bird, 75.
 Rustic Mouse, 43.

S.

Sable, 36.
 Sailor, 170.
 Salangane, 72.
 Salmon, 120.
 Sauria, 89. 98.
 Saw-fish, 113.
 Scalops, 29.
 Scaly Lizard, 59.
 Scansores, 66. 76.
 Sciurus, 43.

Scolopax, 83.
 Scomber, 119.
 Scorpion, 150.
 Sea-blubber, 159.
 Sea-broom, 161.
 Sea-calf, 39.
 Sea-cow, 38.
 Sea-dog, 39.
 Sea-elephant, 40.
 Sea-fan, 161.
 Sea-grapes, 167.
 Sea-hedgehog, 168.
 Sea-hop, 167.
 Sea-lion, 40.
 Sea-otter, 36.
 Sea-polypes, 161.
 Sea-serpent, 95.
 Sea-star, 169.
 Seal, 39.
 Sepia, 167.
 Seventeen-years Locust, 1
 Shad, 120.
 Shark, 112.
 Sharp-nosed Sturgeon, 115
 Sheep, 50.
 Sheep-fly, 147.
 Shellfish, 155. 162.
 Short-nosed Sturgeon, 115.
 Short-tailed Apes, 24.
 Shrew, 29.
 Shrew-mole, 29.
 Silver-fox, 34.
 Silver-gull, 83.
 Simia, 24.
 Skipper, 134.
 Skunk, 36.
 Sloth, 57.
 Small Shrew, 29.
 Snake, 89. 92.
 Snapping-beetle, 134.
 Snapping-turtle, 101.
 Snipe, 83.
 Snout-beetle, 135.
 Soft-shelled Turtle, 101.
 Soft-water Shells, 165.
 Solen, 163.
 Solidungula, 19. 45.
 Sperm-whale, 62.
 Spider, 149.
 Spotted Hyena, 34.
 " Turtle, 101.
 Spring Mackerel, 119.
 Squalus, 108.
 Squirrel, 43.
 Squirrel-monkey, 26.
 Stag, 48.

Stag-beetle, 13.
 Staphylinus, 133.
 Starnose-mole, 29.
 Sterlet, 115.
 Stock-dove, 80.
 Stony Coral, 160.
 Stone-piercer, 163.
 Striped Hyena, 34.
 Strix, 71.
 Struthio, 82.
 Sturgeon, 114.
 Sturnus, 75.
 Subulate Bat, 29.
 Sus, 52.
 Swift-fox, 34.
 Swimming-bladder, 107.
 Swimming Birds, 66. 83.
 Sword-fish, 116.
 Sylvia, 72.

T.

Tadpole, 102.
 Tænia, 171.
 Tailless Apes, 24.
 Talpa, 30.
 Tanagra, 72.
 Tapir, 54.
 Tape-worm, 171.
 Termes, 145.
 Terrapin, 101.
 Testacea, 155. 162.
 Testudo, 100.
 Thoracic Fishes, 108. 118.
 Three-toed Sloth, 57.
 Tick, 149.
 Tiger, 38.
 Tiger-beetle, 132.
 Toad, 103.
 Toothless Mammalia, 19. 57.
 Torpedo, 111.
 Tortoise, 89. 100.
 Toucan, 77.
 Trichechus, 38.
 Trigonocephalus, 95.
 Trionyx, 101.
 Trochilus, 75.
 Tropicolepis, 99.
 Turdus, 72.
 Turkey, 78.
 Turkey-buzzard, 70.
 Turtle, 100.
 Two-hoofed Mammalia, 19. 47.
 Two-toed Ant-eater, 58.
 “ “ Sloth, 58.
 Two-winged Insects, 126. 146.

U.

Univalve Shellfish, 166.
 Ursus, 30.
 Ursine Seal, 39.

V.

Vampire, 29.
 Vein-winged Insects, 126. 143.
 Ventral-fins, 106.
 Vermes, 15.
 Vespertilio, 29.
 Vicugna, 48.
 Viper, 95.
 Viverra, 34.
 Vulture, 69.

W.

Walrus, 38.
 Wandering Grasshopper, 138.
 Warblers, 66. 72.
 Wasp, 144.
 Water-beetle, 133.
 Water-snake, 95.
 Weasel, 34.
 Weevil, 135.
 Whale, 61.
 Wheel-animal, 158.
 Whelk, 166.
 Whirling Water-beetle, 133.
 White Ant, 145.
 “ Bear, 31.
 “ Mouse, 43.
 Wild Boar, 52.
 “ Goose, 84.
 “ Pigeon, 80.
 Wingless Insects, 126. 149.
 Wolf, 33.
 Wolverine, 31.
 Woodchuck, 43.
 Woodpecker, 77.
 Working Bees, 144.
 Worms, 15.

X.

Xyphias, 116.

Z.

Zebra, 46.
 Zibeline, 34.
 Zoology, 15.
 Zoophyta, 155. 158.

Are distinguished by the following peculiarities, which, it is believed, will favorably recommend them to the attention of parents and teachers.

1. The exercises at the beginning of Part I. of the Introduction, adapted as they are to the understandings and vocal powers of the young, enable the teacher not merely to illustrate the different movements of the voice in reading, but to drill his pupils to the proper expression of them; and, as the movements are, as will be observed on examination, connected with obvious peculiarities of sentential structure, easily remembered, preparation is thus made to read intelligently the lessons which follow.

2. All these books contain a studied variety of sentential structure, calling every moment for a corresponding variety of intonation. Most Reading Books, in consequence of a prevailing narrative or didactic style in their lessons, cause the monotony which they should cure. By introducing as large a share of the colloquial and dramatic into the present series as was deemed compatible with a complete exhibition of all the styles, the author has endeavored to force the pupil into the use of variety of tone.

3. The punctuation in these books conforms in the main to the sense and the proper delivery of every sentence, and is a guide to both. When a departure from the proper punctuation occurs, the proper delivery is indicated. (See "*Hints to Teachers*," at the beginning of the Introduction, Part I.) As these books are usually punctuated, it is a matter of surprise that children cannot learn to read at all.

4. Each book, or, in other words, every series as a whole, are progressive: not nominally, but really progressive; that is, beginning in Part I. of the Introduction, with the easiest reading in the language, the lessons continue to task the powers of the pupil more and more to the end. Part I. advances in the same manner from less to more difficult; and having thoroughly mastered this, the pupil is introduced to the "*Course of Reading*," where he commences the study of the simple grammatical principles, so far as a knowledge of them is essential to reading, and also of the analysis of sentential structure on which all good reading depends. When he has exhausted the "*Course of Reading*," the "*Elements of Reading and Oratory*," awaits him; in which he enters on the study of punctuation, modulation, including the nature and laws of emphasis, and particular rules for the delivery of every sentence in the language.

5. In the opinion of competent judges, these books are not less adapted to grammar and composition, than to reading. Reference is here more particularly made to the "*Course of Reading*," and the "*Elements of Reading and Oratory*;" and to those portions of these works in which the sentences employed in the English language are classified and described, and copious examples of them adduced in every degree of expansion. (See *commendatory letters from various sources*.)

6. While the author has been at great pains, to introduce as large an amount of useful and innocently amusing knowledge into his books as his limits would permit, he has uniformly been earnestly intent on making the whole subservient to sound morality and religion; purity, patriotism, and piety.

SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01506 6202